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THE FLOWER MEMORIAL LIBRARY

Beautiful Building with Artistic Decorations—Designed by Charles Rollenson Lamb—Well Adapted to Use of Public Library

By Our Special Correspondent

IN the building of libraries there is no end, as in the making of books. And it is eminently fitting that in each community, whether it be large or small, the building should be erected in memory of some well-known public character. Oftentimes, as in the case of the Flower Memorial Library, the public man belongs not only to the locality, but to the state and the nation. Roswell P. Flower, by an active, aggressive and honorable career, left his mark as a statesman and a business man upon the State and the Nation. No more appropriate memorial could be erected in his home city—Watertown, N. Y.—than a public library. His daughter, Mrs. Emma Flower Taylor, has honored herself by thus perpetuating the memory of her illustrious father. Cities throughout the United States will be interested in a description of the building, both from the practical and artistic viewpoints, as it stands complete as one of the most perfect library buildings yet erected in the country.

The building itself is thoroughly fireproof and is 60 feet deep, with a frontage of 115 feet. The interior and exterior of the building is of Vermont marble, absolutely white. The structure is classical in all exterior treatment, and the stone work from the grade to the water-table is of the typical Grecian square inclosures. Across the front of the building there is a large classical colonnade, the columns of which are two feet in diameter at the base and terminated at the top with an Ionic capital. The entablature is of the Ionic order.

There is a large dome above the grand rotunda, constructed of white marble as far up as the cornice, above which is copper. At the apex there is a large metal skylight. The roof is constructed of iron girders and expanded metal, and on top of the expanded metal flooring there is a covering of Caledonian tile laid in asphalt cement.

The windows in the front and sides of the building are of plate glass, and the large windows facing the street and

between the pillars of the colonnade are of one solid piece. The entrance to the library is between two of the large columns in the center of the building, and opens into a vestibule which leads into the rotunda.

The doors are very beautifully designed, being a handsome combination of iron and bronze, heavy plate glass serving as panels. Above the doors rests an open book bearing the inscription, "Flower Memorial Library," the metallic volume itself being entwined with oak leaves and laurel.

Passing through the entrance proper the main vestibule is entered. The floor of the vestibule is of marble, and the seal of the city is set in the flooring, and is first seen by the individual entering. The Latin word, "Salve," meaning welcome, is also inlaid in the floor. The vestibule walls are of marble. A Mosaic ceiling surmounts the room. The passageway from the vestibule to the rotunda itself is through swinging plate glass doors.

The rotunda is about thirty feet in diameter, and from its base arise the pilasters which extend through the mezzanine to the entablature supporting the dome. The dome is surrounded by symbolical figures—history, epic poetry, science, drama, lyric poetry, religion and fable being represented.

The marble pilasters supporting the dome are placed on an octagon and are connected by marble door trims and marble balustrades. A circumference frieze serves as a base for the dome, bearing the inscription, "To know wisdom and instruction, to perceive the words of understanding." The floor is of marble, and inlaid in it are the twelve signs of the zodiac.

The individual entering the vestibule from the rotunda looks directly through to the stack-room, where are kept most of the books. Beneath the stack-room is a smaller basement room of a similar character.

A passageway to the left of the rotunda leads into a

small, complete room, which serves as a corridor to the main reading-room. The room is alone of itself with decorations according to the general scheme, one of the noticeable features being the wall fountain on the east side. From this corridor to the west is the entrance to the small conversation room, which is decorated throughout with the general scheme of yellow.

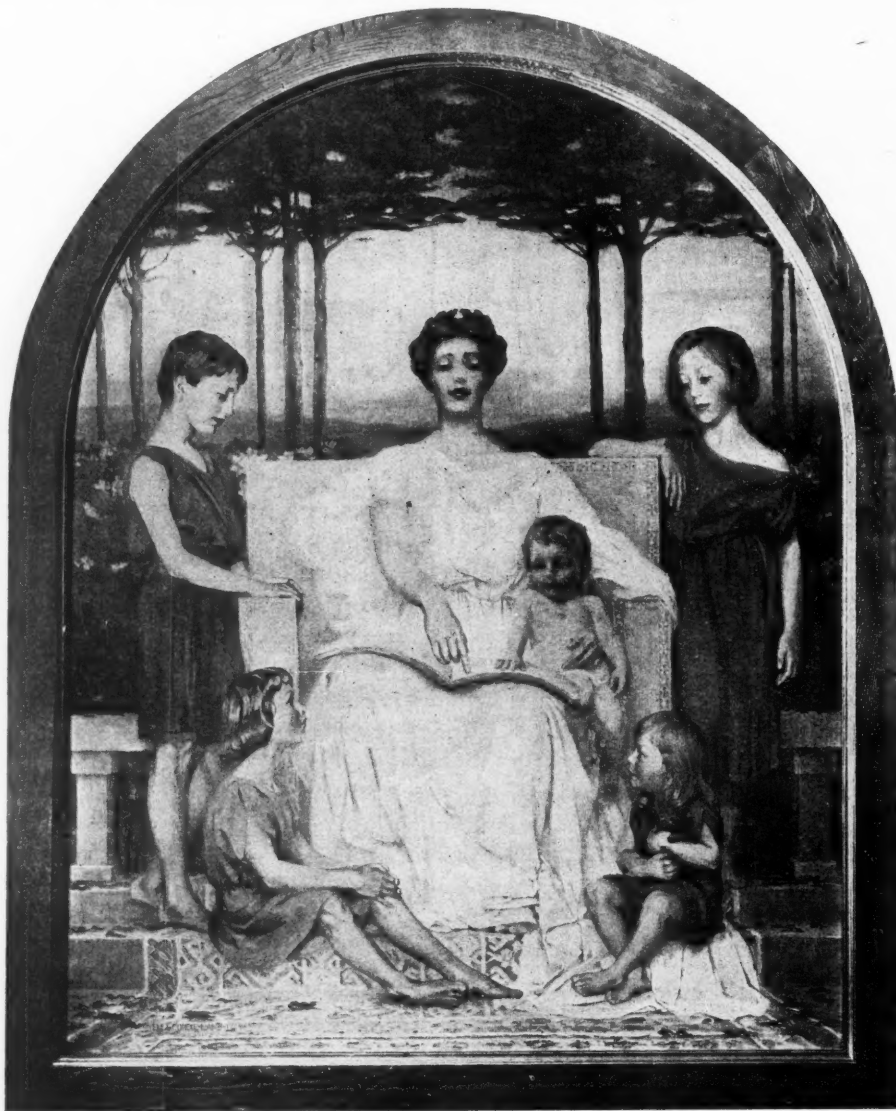
The main reading-room is one of the pleasantest rooms in the library, and here the decorations appear to as good advantage as anywhere in the entire building. One of the principal attractions is the mantelpiece, which represents a combination of marbles, Italian and Sienna, delicately inlaid in a rich design. The inscription, "Knowledge Is Power," is engraved upon the marble piece over the fireplace. The principal decoration of the room is a painting representing education. The end wall panels show a decorative treatment of trees bearing open books upon which are placed the names of the principal authors of the world's literature.

The south room, at the opposite side of the rotunda, agrees in size and general design with the main reading room, and is reached through a separate corridor off from the rotunda similar to the one through which the main reading-room is reached. Another conversation room, the color scheme of which is red, is entered directly off from the corridor through which entrance to this south room is reached to the north. The south room itself will be utilized as a general assembly room, and as such it is designated. From this room swinging doors extend to the reference library on the east, and thence the passage leads to the librarian's room and through it to the stack-room at the rear of the building.

The children's room, which is reached through a passage on the northeast side of the rotunda, is one of the most interesting rooms of those in the building. The principal feature is the fireplace, which forms a memorial to

Roswell Flower Taylor, a son of Mr. and Mrs. Taylor, who died in infancy. The idea of the decoration is that two children are paying tribute to the little boy that is gone by bearing flowers to him. The entire furnishings of the room are harmoniously carried out with the bluish-green effect.

The various rooms described completely encircle the rotunda. The wall decorations everywhere are of poetry, history and art, and innumerable quotations are inscribed upon the walls. The walls everywhere are covered with a wealth of decoration.



"THE OPEN BOOK," MURAL PAINTING IN THE NORTH READING ROOM, ELLA CONDIE LAMB, ARTIST

Staircases lead left and right from the front of the rotunda to the second floor. On the north staircase wall is a canvas representing the conference between the French and Indians, a peace conference held at La Famine Bay, or Henderson Harbor as it is familiarly called, in 1684. On the south staircase is a canvas representing the first celebration in Jefferson county of the Declaration of Independence. The celebration, as shown in the painting, took place at Independence Point, Chaumont, July 4, 1802. At the landing from the staircase paintings of the Indian chief Garonkontie and Chevalier Champlain are done upon the west wall.

A handsome marble balustrade bounds the mezzanine floor and furnishes an outlook from it into the rotunda. This floor extends from the left staircase to the right nearly around the circumference of the rotunda, and is embellished with as beautiful decorations as are to be seen anywhere in the building. The principal decoration on the north side is a canvas of the battle of Sackets Harbor, showing the vessels under full sail and the old fort in the distance.

A series of five society rooms extend along the rear of the second floor. The first one of the series, the north room, is devoted to the LeRay de Chaumont chapter, Daughters of the American Revolution. A frieze carries

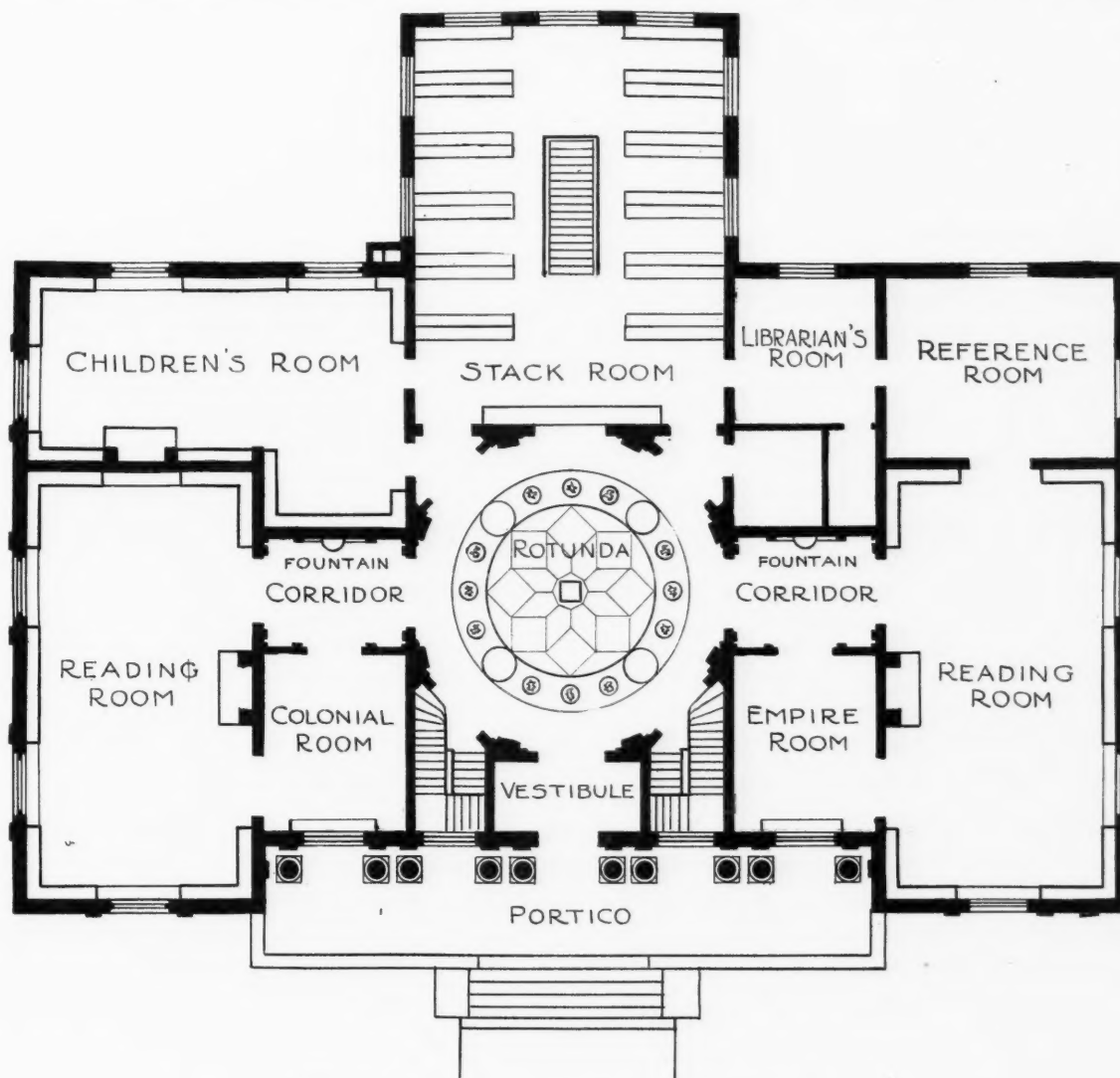
all around the room, showing a decorative treatment of the historical houses of the county. All of the old homes of the prominent early settlers are shown, among the number being those of General Sacket, Dr. Guthrie, LeRay de Chaumont and General Brown. The paintings of the LeRay chateau and the LaFarge mansion are extremely interesting, as are also the paintings of the Cup-and-Saucer house and the ruins of old Fort Carleton on the St. Lawrence, shown in the same room. This room will be used by the local chapter, D. A. R.

A smaller room, No. 2 of the series, extends farther across the rear, and is known as the theological room. In this room a frieze extends around bearing the names of

containing the grain. Leading from this room to the roof proper of the stack-room is the pergola, which has been designed as a summer garden, with a fountain, columns, seats, tables and other fittings, vines and bay trees providing the setting of vegetation.

To the south of this room, and fourth in the series of society rooms, is the medical room, and in the same manner as in the theological room the names of twelve leading medical authorities of the world are inscribed around the frieze.

The fifth room of the series is devoted to the historical society of Jefferson county, and the decorations of the room are all of an historical character. In dimensions the



FIRST FLOOR PLAN

the leading theologians of twelve countries, the names being placed upon open books on the decorative frieze.

The third room of the series is the old Watertown room, and serves as a hallway of the general passage around the rotunda, doors admitting entrance to the other arcs of the rotunda. The room is on the east side of the library, the rear. A frieze carries around the room, showing scenes of old Watertown and Watertown Falls as it was one hundred years ago. The old arsenal is shown in its original dignity; also Public Square during the early history of the community, and the first mill in the city—a crude stone suspended to fall with weight into a hollowed stump

room is of the same size as the chapter room on the opposite side of the building, and is similar in general arrangement to the other room. Each room has a fireplace, and each is decorated with the frieze of historical scenes. Over the fireplace mantel is a copy of a muster-roll of a command organized within the county in 1788. The frieze shows very accurately Sacket's Harbor as it was in 1815, the old shiphouse standing forth prominently in the scene. Other historic buildings are also shown in the frieze.

The south mezzanine wall balances the one on the other side of the library with a canvas showing the battle of Lake Erie. The individual passes by this picture down the



"RELIGION," ONE OF EIGHT FIGURES, PERSONIFYING THE VARIOUS BRANCHES OF LITERATURE, FREDERICK STYMETZ LAMB, ARTIST

south staircase and finds himself in the main rotunda again and at the doors through which entrance to the building is gained.

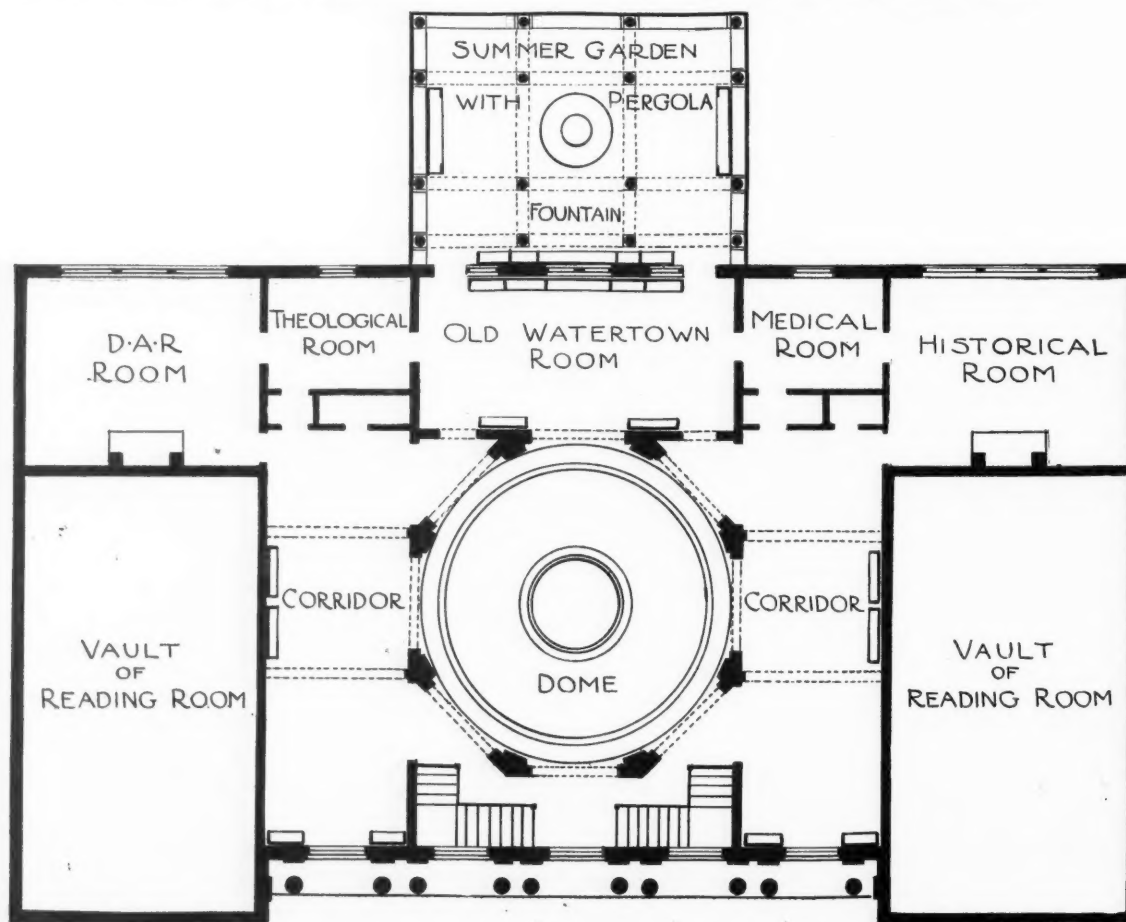
A complete and extremely noticeable harmony of color prevails in all the decorations in the building. The effect created is restful and gratifying, and at the same time is stimulating. There is no blurring of the elated feeling which characterizes one's state of mind during a trip through the building, and withal the impression created by a journey from room to room is inspiring.

That unity in the general design and the general harmony of color of the interior are due entirely to the Messrs. Lamb, who have personally supervised the work from the

commencement, and they add one more success to a long line of important examples of civic, religious and private interiors, in which the entire question included in both color and form in all the varying materials employed in marble workings, mosaic, mural painting, stained glass, bronze and other metal work are combined. Mr. Lamb, in discussing the work with the donor, Mrs. Taylor, said, comprehensively, that he would be responsible for the color effect and the harmonious relation of all materials used in "everything one sees upon entering the front door throughout the entire building."

Mr. Frederick Stymetz Lamb wisely asked the criticism of competent authorities as to the sub-division of the great central thought, "Literature," into its component parts. Thus the figure of "History" is balanced by "Romance"; "Religion" by "Science"; "Fable" by "Drama"; and "Lyric Poetry" by "Epic Poetry," and as comprehensive a series of symbolic figures as could have been selected has thus been secured.

"The Open Book," by Ella Condie Lamb, has probably attracted more attention than any mural decoration of its character, probably because the artist has as a central thought expressed even in the title the fact that the public libraries of the United States are free to all. Books are indeed "open." The closed book of the "dark ages" disappears. The book is no longer "chained to its place," as in the medieval library. In its place America shows the ideal—literature of all time placed within the reach of every citizen, even the youngest child.



SECOND FLOOR PLAN

HIGHWAYS OF FRANCE*

An Inspection of the Boulevards and Avenues of Paris and Roads of the Surrounding District—Service of the Public Ways

By William Ballantine

WHILE this new system of road improvement may prove useful for laying the dust on more important parts of highways, passing through towns or villages, it is not likely, in the meantime at least, to be used to any extent on country roads.

As already stated, the roads in France suffer more from drought than from wet. They dry quickly after rain, and in order to shade and protect the surface from the dry heat of summer, the planting of trees on the sides of the roads has been largely adopted. As showing the importance that has been attached to this matter, royal decrees have been passed determining the manner of planting, the kind of trees to be used, and the penalties to be imposed on those who injure them. In the annual report of the engineers in the several departments notice is made of the length of the roads planted, the number of trees and their condition. In the Department of the Seine and Marne, for example, the engineer reports that, in 1903, 388 kilometers of the national routes were planted, the number of trees being 100,306, and that thirty-nine had been felled and sold. The trees generally used are Swiss poplars, acacias, elm, sycamore, Norway maple, etc.

The beautiful boulevards and avenues of Paris are among the leading features of the city. They generally extend in straight lines, but at different angles, from the many "places," or open spaces, and their broad carriageways, rows of trees, ample side promenades, and the excellent manner in which they are kept, greatly enhance the appearance of an otherwise gay and fashionable city.

The management of the "service of the public ways" is primarily under the Prefect of the Seine (who represents the National Government), and the Board of Public Works, but the real work is immediately in charge of the engineer-in-chief of the city, M. Paul Cur, who has on his personal staff fifteen superintendents, twenty-two overseers and nineteen assistants. The city is divided into eight sections, with a resident engineer in each, and they, together, have a staff of 108 superintendents, 111 overseers and 95 assistants. Each section is again divided into six districts, with a superintendent in immediate charge, and with one or more overseers or assistants as the duties require.

In visiting the various works in progress on the city streets we met with a number of these officials, who received us courteously and explained, in detail, the works being carried out under their charge. We greatly admired the excel-

lent management bestowed on all the departments of street construction and maintenance, and the most perfect manner in which the works were being executed. The managing staff is, no doubt, a large one, but the work to be carried on is proportionately great. There are at least 11,000,000 sq. yards of carriageways, and nearly 9,000,000 sq. yards of foot-walks. About 6,000 workmen are employed in maintenance and street cleaning, and in 1893 (the latest available return) about 7,000,000 francs were spent on maintenance and cleaning, exclusive of new work and management.

The boulevards were, at one time, paved with cobble-stones and block stones, but during the insurrections the stones were lifted and used for barricades, with the result that the authorities ordered the paving to be lifted and the streets laid down in asphalt or macadam. In after years, as the traffic increased, it was found impossible to keep the macadam in order, even at very great expense, and a return was made, in the principal streets, to the stone blocks, which again, on account of its noise, is rapidly being displaced by wood paving. There are still, however, a large number of macadam roads within the city.

In maintaining these city roads the older system of patch-work repair (except for filling holes to preserve an even surface) has been given up, and that of recharging or coating and steam rolling is generally adopted. The material used is the white flint, millstone grit and porphyry. The latter, brought from the Vosges Mountains, is the best stone, resembling our Scotch whinstones, but on account of its cost it is only used on streets where the traffic is heavy. In ordinary circumstances the thickness of the coating is 4 in., although in special circumstances it may be less or more. The work of repair is carried on during nine months of the year—March to November—in order to give regular employment to the roadmen and utilize the time of the steam roller.

The city has five steam rollers—one of 28 tons, two of 26 tons, one of 17 tons and one of 16 tons. These, compared with those in use in this country, are exceptionally heavy, but their weight is more evenly distributed on the road than is the case in English types, where the greatest weight is on the two hind wheels. The binding used in rolling, as we saw it in the Avenue de Wagram, is the sharp yellow gravel which is so abundant in the locality.

The upkeep of these macadam avenues, when the traffic is heavy, is somewhat expensive. In dry weather they require frequent watering and washing of the entire surface at least once a week, as well as regular sweeping with the horse brushes. One hundred of these machines are used on the macadam roads alone. All this tends to a more rapid wearing of the surface, as well as extra cost in labor, but it is all necessary to keep them clean and free from dust. The

* This report on French roads, by Mr. William Ballantine, of Falkirk, is the outcome of a visit to Paris and the surrounding district, and forms part of an interesting pamphlet in which the circumstances leading up to the visit, and the programme carried out during the four days set apart for it are fully detailed. The deputation was composed of twelve Scottish road surveyors, who were most cordially received and assisted by the chief municipal officials of Paris. The report was published in "The Surveyor and Municipal and County Engineer," London, England.—[Editor.]

average cost of maintenance of these streets is about 44 cents per sq. yard, and when the annual cost exceeds 50 cents per sq. yard it is considered more economical to pave with either wood or stone. Wood is now the favorite paving in Paris. It makes the least noise, is easily cleaned, quickly renewed when worn out, and at most times has fairly good foothold for horses. From the diagram we saw at the city wood-paving store, illustrating the comparative areas of the different kinds of paving in the streets, the yellow color of the wood was shown to be year by year gradually overshadowing the blue and brown colors, representing the stone paving and macadam, respectively.

Wood is generally laid on the avenues open to the sun and wind, stone paving when there is much heavy wagon traffic, and asphalt on the narrow streets and lanes. The wood mostly used is pine wood, grown in the forests of France. It is delivered in deals at the city stores, where by special machinery it is cut up into blocks, the usual size being 6 in. deep by 9 in. by 3 in. It is then passed through the creosoting tanks and stored to be ready for use. This paving is always laid on a concrete foundation 6 in. to 7 in. thick, truly finished to the desired convexity with fine cement. The surface of this foundation, as we saw it on the Rue de Temple, was floated, beautifully smooth and true, like a finished floor. The paving blocks are then laid hard on this surface (without any sand). The pavior, with a hatchet in his hand, deftly lifts the blocks with it one by one, places them in position in a row, and so quickly does he do this that he almost walks, as it were, from side to side, completing a row as he goes. The blocks are spaced in the rows with thin strips of wood. When a few rows have been laid the strips are withdrawn and hot coal tar or pitch, to the depth of 1 in., is poured in, simply for the purpose of steadying the blocks, which are then grouted up with fluid cement and fine sand (about half and half), until the joints are perfectly filled. The cement grout is used in preference to pitch, as it does not melt in hot weather and gives better foothold to the horses.

While the quality of the wood used may not be so good as the Australian hard woods, still, the pine blocks, if carefully selected, are found to wear well. It is the weak or defective blocks that first give way and cause the surface of a street to become uneven. Hence great care is taken to see that every block is sound before being laid, and so ensure as far as possible an equal wear on the street surface. A well laid wood pavement in the boulevards, where there is constant traffic, has been found to last from nine to ten years. When the blocks in a street have become worn and defaced they are lifted, the damaged edges pared off with a revolving cutter, and then turned upside down and relaid on the old concrete bed, but on this occasion with a layer of sand as a cushion for the worn surface of the block.

The stone block paving is being less used than formerly, and only as already stated, in the second-class streets, where there is heavier and slower traffic. The stone for this purpose is now almost exclusively taken from the city quarry at Maréchaux, where the white flinty sandstone is worked. This quarry was at first used to ascertain at their own hand, the true cost of paving blocks, as well as to defeat any combination that might arise on the part of the contractors

supplying material to the city. The best class of this paving is laid on concrete foundation, but the greater part of it is laid on gravel and grouted with cement. The setts are made from 4 in. to 5½ in. broad, but this width does not inconvenience the traffic, as the French horses are shod plain and don't depend so much for grip on the joints in the setts as do ours. Besides, the nature of the stone itself gives a good foothold for the horses.

The vehicular traffic on the streets of Paris is very great, especially on all the leading thoroughfares, which are constantly crowded with all sorts of vehicles, and it is said that in consequence thereof the wear and tear on the streets of Paris is greater than in any other city in the world. The three-horse omnibuses weigh, when loaded, from 5 to 6 tons. Their rate of speed and frequent stops must no doubt be very destructive to the streets, but apart from these and the heavy, slow-going merchandise wagons, most of the traffic, though fast and constant, is light in character. All the cabs, carriages, and many other vehicles have either rubber or pneumatic tires. The horses are smoothly shod, and when it is considered that every third or fourth vehicle is a motor-car, gliding smoothly along the wood-paved streets, we concluded that the traffic though great was so carried that less damage was being caused to the surface than in other cities where vehicles are more of the old type and the streets not so smooth.

Wood paving as we saw it in Paris is at present the ideal pavement for light, fast-going, rubber-tired vehicles, and the fact that the wood paving in the Place de la Concorde lasted for ten years before requiring renewal shows that the great traffic is not so destructive to the surface as one would naturally suppose it to be.

Pneumatic-tired vehicles, in certain states of the weather, do harm to macadamized roads, but on the wood-paved avenues of Paris, or any other well-paved street, they do no harm at all in any circumstances, and hence by the increase of motors a great amount of traffic may be carried along the streets of towns with the minimum amount of wear to their surface, and a great annual saving in the cost of maintenance.

As showing how the motor traffic is increasing in Paris it may be stated that the number of horses of the lighter class in the city alone has decreased by 1,000 during the past year.

The sidewalks in the principal streets are broad and spacious and are kept in beautiful order, being washed, if necessary, every morning. They are laid with bituminous mastic or mastic asphalt on a foundation of concrete 3 in. thick, the mastic being 1 in. thick. This is one of the best materials in use for footpaths. It absorbs no moisture, has no joints, is easily cleaned, requires less cross fall than other pavements, and does not melt with the heat of the sun. So tough, hard and durable is this material that it has been described as a species of mineral leather. The bituminous mastic is heated to a high degree of temperature and mixed with a proportion of sand, and when hot and plastic is spread on the top of the cement bottoming, and made smooth with wooden tools. A little dry sand is then sprinkled over it, and in twenty minutes it is ready for traffic.

Great attention is bestowed on the cleaning of the streets

in Paris. Conspicuous features in the work are the frequent washing of the carriageways, channels and sidewalks, and the abundance of water used for this purpose. The water for cleaning purposes is pumped from the Seine, into reservoirs, and carried in pipes along the streets on which fire plugs are placed at regular intervals, on the side of the path, and the watering and washing is done by hose. The sweeping is done by horse brushes, which start very early in the morning. The rough garbage is put into the dust wagons for removal and the smaller refuse is washed into the openings under the curbstone, and thence into the sewers, where it is collected in the "sumps" and removed by special machinery. When the household rubbish is being collected, rag pickers stand in the wagons and assort the material into bags. A woman sweeper sweeps up what falls from the cart, and the rest is swept away by the washing which follows. About 3,600 hands are employed in the cleaning alone, of whom about 1,000 are women, and they collect about 1,000,000 tons of refuse per annum. The women sweepers work seven hours a day and are paid 60 cents. The rag pickers only work when the refuse is being collected. They get whatever of value they find, and 24 cents per day additional. All others work ten hours per day, and roadmen and laborers are paid from 90 cents to \$1.00 per day.

The watering of the streets to allay the dust is carried on from March to October. It was formerly done by watering carts, but much of the sprinkling is now done by hose. Each roadman on a section has a sprinkling apparatus consisting of a few lengths of 1½-in. iron pipes with flexible joints on which castors are also fixed for the easier dragging along the street. This he attaches to the hydrants on the side path and sprinkles from 20 to 30 yards on each side. This method does not occupy space in the street, or inconvenience the traffic, and is about one-half cheaper than watering with the horse and cart. The sprinkling is done twice a day, and in very hot weather three times a day. The city authorities have also been experimenting with tarring the surface of parts of the macadam avenues, but not to any great extent.

The sewers which carry off all the water used in the washing of the streets and channels are of large dimensions and extend to 200 miles in length. Those under the main avenues are 12 ft. in diameter. Besides the sewage or rather water which flows in the bottom of the sewer, they contain the water pipes (spring water, and flushing water from the Seine), the electric, telegraph and telephone cables. The gas pipes are kept out in case of explosions. On the large sewers a steam launch is provided for the visitors, and at other parts an electric car is the means of conveyance. The tunnels are kept in beautiful order, whitewashed, and lighted by electricity. The air in the large sewers was found by analysis to be purer than that in the streets of the city. Without these large sewers it would be impossible to wash the mud and refuse so freely off the streets. With such treatment ordinary-sized sewers would soon choke up, but with their ample size and the abundance of water used in washing and flushing all the refuse is carried to the "sumps," where it settles and is lifted out with dredger cranes, to be disposed of in boats.

The main sewers discharge into the Seine 10 miles below the city.

The last day of the visit was devoted to an inspection of the many beautiful bridges on the river Seine, and these we viewed to great advantage from the steamboat which conveyed the party up and down the river. The city being built on the right and left banks of the Seine, many links of communication are required between the one side and the other, and to meet the requirements of the great traffic we found that within the city boundary, from Pont National to Pont du Jour, there were no fewer than thirty-two bridges, all of large dimensions. Pont Neuf, which crosses both arms of the Seine, is 360 yards in length and 75 ft. broad.

A large proportion of them are stone bridges of five spans, with segmental or elliptical arches, the lines of which were greatly admired. In this respect particular mention may be made of the Pont de Austerlitz, whose lines were exceedingly pleasing, and altogether, as viewed from the river, it is a bridge of great beauty.

In referring to these stone bridges, which are still so serviceable and so much admired, it is only right that we should mention the name of Perronet, the great French engineer, who built quite a number of them in the eighteenth century. In 1725, when only seventeen years of age, he was appointed to superintend the construction of the great sewer then being formed under the Tuilleries, and on the founding of the institution of the Ponts et Chaussées in 1747 he was placed at its head and obtained the title of chief engineer of that body. Thirteen bridges in and around Paris were executed from his designs, there being also eight which he projected. All are remarkable for some peculiar beauty. Some were masterpieces, which in their own line have not been surpassed, such as Neuilly Nemours, St. Maxence, and that of Louis XIV. at Paris.

Many of the bridges in Paris are named after French victories gained in battle, and are adorned on their piers, buttresses and approaches with colossal statues and figures emblematical of the incidents in the wars they are intended to commemorate.

Among the bridge works in progress on the river, which were examined with some detail, was the new iron bridge of 500 ft. span near the Pont de Austerlitz, for the Metropolitan Railway crossing the river. The party visited the Pont de Bercy and received explanations of the work going on there. This is a stone bridge of five spans, and it is being widened by extending the piers and arches on the south side to the same segment, so that the existing style of the present structure may be preserved. Other works visited were the Mirabeau Bridge, the Skew Bridge for the West Railway Company, and the Passey Bridge, which is an arched iron bridge for a new line of the Metropolitan Railway. The Alexandria Bridge, erected for and opened at the last Paris International Exhibition, was also inspected. It is an iron ribbed bridge of one span, highly ornamented on both sides with cast-iron panels, floral festoons, etc. It has very elaborate masonry in the abutments, wing walls and parapets, and on each approach there are two colossal stone columns surmounted with gilded figures. This is now one of the most beautiful bridges on the river.

All the works on the roads, streets and bridges which we were privileged to see were exceedingly instructive and interesting.

MUNICIPAL RAILWAYS IMPOSSIBLE

For the Immediate Future in Chicago, Says Mayor Dunne—Ultimate Ownership Possible

By Our Special Correspondent

MAYOR DUNNE has practically given up, for the present, absolute municipal ownership and operation of street cars. The Mueller law forbids the city from directly engaging in the construction of a street-car system; it permits the city, however, to purchase a system already built. To get around that obstacle the mayor conceived the organization of a corporation which should build the system for the city and turn it over to the municipality. This was one of two proposals which the mayor submitted to the city council.

PLAN NOW FAVORED BY THE MAYOR

This plan, which he calls "contract plan," provides for the incorporation of a company managed by five men "who command the confidence of the people of Chicago for their personal integrity, their business ability and their pronounced sympathy with municipal ownership." To this company is to be given a twenty-year franchise covering the streets in which the rights of the old companies have already expired or are about to expire. Stock sufficient to pay for the construction and equipment of a 240-mile system is to be issued and sold at popular subscription. At any time the city may elect it may take over the property on an appraised valuation. An alternative scheme was submitted to the aldermen. This the mayor called the "city plan." It proposed that the city at once take over the same streets referred to in the first plan and operate street cars in them. The mayor favors the "contract plan."

MESSAGE OF THE MAYOR

The message was as follows:

"The people of Chicago, having plainly manifested their desire for municipal ownership of street railroads with the least possible delay, I have diligently sought, since my inauguration as mayor, for the best information and the best advice regarding the subject, and have carefully considered all suggested plans. I now submit to you the results of this preliminary work. Asking your co-operation in further executing the duty with which we have been jointly charged by the people in this connection, I cordially offer you all the additional assistance it is in my power to give.

"As I am advised, there are about 700 miles of street railroad track now in operation in our city. The operative rights of private companies with reference to a considerable proportion of this trackage have incontestably expired.

FRANCHISES SOON TO EXPIRE

"Their expiration as to the Adams street line has been actually adjudicated by the Circuit Court of the United States, and in harmony with the reasoning of that adjudication more than one hundred miles of homogeneous track-

age, most of which runs through densely populated portions of the city, is already free from corporation control, and 240 miles in all of like character will be free within the next two years. At varying intervals there will be further additions to this system, and within six or seven years a great majority of all the 700 miles of trackage now in operation will be incontestably subject to municipal ownership.

EXPECTS LEGAL BATTLE

"But that is not all. My legal advisers are confident, and this confidence is shared by me, that a rule more favorable to the city than that adopted by the circuit court will be established by the court of last resort. In this event the 240 miles of trackage incontestably at the free disposal of the city now and within the next two years will be greatly increased within that time. Confident of this increase as we are, we must expect strong and persistent opposition and be ready to cope with much dilatory litigation and other vexatious obstructions. The financial interests at stake are so vast and aggressive that public interests are in jeopardy, and at this critical juncture the rights of the city may depend upon the fidelity of your honorable body. To the patriotic devotion of every member in this behalf I am sure the citizens of Chicago may look with confidence.

"While in litigation we vigorously oppose the rights of the city to the claims of corporations that have been and continue to be persistently indifferent to their franchise obligations, we have official duties that cannot be ignored regarding the trackage over which corporation rights have incontestably expired. This trackage being already available for municipal ownership, our duty is plain to bring it speedily within the scope of that policy.

DISMISSES TENTATIVE ORDINANCE

"We are occasionally referred in this connection to the so-called 'tentative ordinance.' But that ordinance cannot be further considered without flagrantly disregarding public opinion lawfully expressed. Alike by advisory referendum and the mandate of a decisive municipal election the people have distinctly and emphatically condemned it, both as to form and principle.

"Turning, then, to their demand for municipal ownership, I submit for your consideration two plans to secure this result. One of these plans, attached hereto and marked 'A,' may be briefly identified as 'the city plan;' the other, also attached, and marked 'B,' may be distinguished as 'the contract plan.'

"These are the only plans of which I am advised that commend themselves to my judgment, and of the two I prefer the second. The reason for this preference is its

manifest superiority as a means of accomplishing the object in view—namely, the earliest possible installation of good service and the establishment of municipal ownership of the entire street-car system of Chicago.

WOULD AVOID DELAY

"In view of the extreme need for immediate improvement in our street railway lines, reduced to the lowest level of bad service by the system of private ownership and operation which has prevailed, every element of delay in rehabilitation is to be avoided as far as possible with due regard for the street railway policy that the people demand and for which the Mueller law provides. Under the 'city plan' there are many elements of delay which may possibly be magnified by factious opposition.

"But under the 'contract plan,' which is equally consistent with the Mueller law and the policy of municipal ownership and operation, all elements of delay are eliminated.

"Financially, as well as legally, this plan would be immediately practicable. It consequently would enable us to proceed at once with reconstruction, under circumstances assuring as good service and at as early a day as the best conceivable system for private profit could provide. Yet the rights of the city to take over and even to operate would be neither impaired nor postponed. As soon as a market for the Mueller certificates has been secured the city could acquire the system in its own right and its own name; as soon as the people had by referendum under the Mueller law so decided, the city could proceed to operate by its own employees.

ADVANTAGES OF THE PLAN

"Most of the advantages of municipal ownership and

operation would thus be immediately secured. There would, therefore, be no delay in realizing that policy in substance even while such judicial, financial, legislative and referendum proceedings were being taken as might be necessary to perfect it in form or to guard it by business adjustments against encroachments of the spoils system.

"The 'contract plan' provides in effect for what the Mueller law contemplates and the people have demanded—immediate municipal ownership of the street-car service. It provides for this system of street-car service under the management of a board of directors in its preliminary steps and without the intervention of such board as soon as the city raises the necessary capital and complies with the statutory requirements.

PRESENTS AN ORDINANCE

"In furtherance of this superior plan I present herewith for your consideration an ordinance and recommend the appropriate proceedings for referring it to your committee on local transportation. I further recommend public hearings before your committee for the purpose of considering objections to the proposed ordinance and the fullest explanation and exposition of its purpose and provisions, and the consideration of such amendments not in conflict with its essential features as may be deemed proper and necessary for the interests of the city of Chicago.

"I also recommend that pending final action upon this ordinance the council provide for securing the submission to the voters of Chicago at the next general election, under the advisory referendum statute, of the 'contract plan,' for the execution of which the proposed ordinance has been drafted."

RAILROAD SPUR TRACKS IN SAN FRANCISCO

THERE are new developments regarding the construction and maintenance of spur tracks on public streets in San Francisco connecting warehouses and manufactories with railroads entering that city. The Supervisors are granting the privileges to all applicants, but the Board of Public Works is refusing to acknowledge the authority of the Supervisors in the matter, and being a labor union body, are opposing the construction of new tracks and the maintenance of old ones in favor of the Draymen's Association and the Teamsters' Union.

The large firm of Holbrook, Merrill & Stetson, dealers in hardware and plumbers' supplies, etc., recently secured a favorable resolution from the Supervisors, and without consulting the Board of Works, laid a spur track, securing an injunction against the Board of Works when it attempted to tear up the said track. This injunction suit was heard by Superior Judge James M. Seawell, who now has the matter under advisement. The stand taken by the Board of Works, which was represented in Court by the attorney of the City Front Federation, Teamsters' Union, etc., is that the Charter of San Francisco does not give any authority for the construction of spur tracks, the said attorney openly stating that if the merchants and manufacturers of San Francisco cannot do business without spur tracks here they

should go to other places where such facilities are afforded.

Ex-City Attorney Franklin K. Lane represented Holbrook, Merrill & Stetson. Answering the argument that the streets cannot be used for private purposes, he stated that nearly every street in San Francisco and elsewhere is being so used, such as for the telephone system; deposit of building material on streets; construction and maintenance of steps and stairways on the sidewalks; the use of the streets under sidewalks for cellars in business houses, for safe deposit vaults in banks and for dining rooms and saloons. He showed that it would be impossible for San Francisco to receive and export freight in competition with other cities without spur track accommodations, and that they are afforded in every other city in the United States. Mr. Lane also contended that there could not possibly be any authority in the Board of Public Works to grant permits for this purpose, or to do the work itself, as it could not tear up the tracks of a public railway corporation, interfering with traffic on the main line, etc.

Since the argument of this case, Rosenberg Bros. & Co., large fruit packers, obtained a permit for a spur track from the Supervisors. The Board of Works immediately sought an injunction to prevent them laying this track, as was done by Holbrook, Merrill & Stetson.

MUNICIPAL LIGHTING FOR NEW YORK*

The Proposed New Lighting Plant Soon to Be Run by the City—First of Several Plants to Be Built

THE technical commission on electric lighting for the city of New York, consisting of Dr. Cary T. Hutchinson, Nelson P. Lewis and Prof. George F. Sever, has submitted to the Board of Estimate and Apportionment a report giving the cost of construction and operation of a city electric plant to supply all of the city lighting by electricity for streets, parks and public buildings.

The city owns a plot of ground bounded by Avenue A, Ninetieth and Ninety-first streets and the East River, and it is proposed that the central station be located upon this plot. It is understood, however, that a large sum would be required for the necessary land. The power house, views of which are given in Figs. 1 and 2, will comprise a boiler room, a turbine room, with switchboard galleries, and two wings for

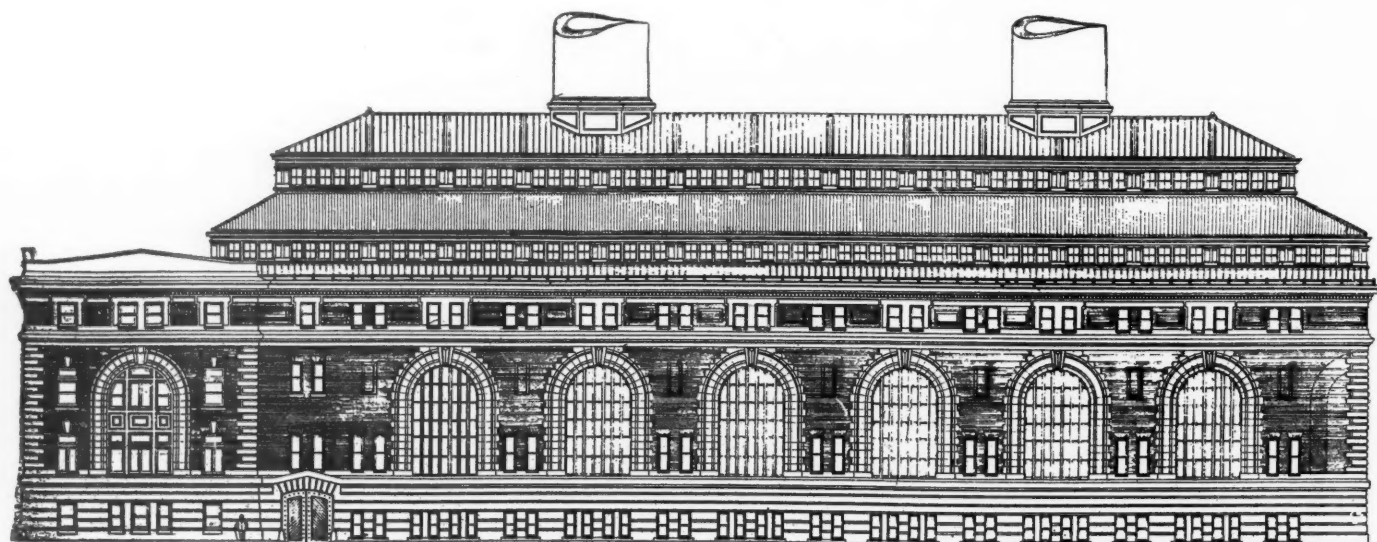


FIG. 1.—SIDE ELEVATION OF POWER HOUSE

The report deals in great detail with the problem and claims that with the proposed equipment each arc lamp for which the city is now paying \$146 per year can be operated at an annual cost of \$64.07, and that at 5.5 cents per kw.-hour the city can obtain incandescent service which now costs 10 cents per kw.-hour. The estimated cost of complete plant for

office purposes. Each office wing is to be approximately 50 ft. deep by 53 ft. wide. The boiler room is to be 88 ft. wide by about 260 ft. long. The turbine room is to be 103 ft. 5 in. wide and the same length as the boiler room. The building is to be constructed of reinforced concrete and masonry.

The specifications call for two 5,000 kw. turbo-generator units, three 3,000-kw. turbo-generator units, and one 1,000-kw. turbo-generator unit, together with one turbine or engine-driven exciter of at least 200 kw. capacity for exciting purposes. In Figs. 3 and 4 are shown the arrangement of the units with vertical turbines. The arrangement with horizontal turbines is indicated in Fig. 5. The exciter is to be wound for 125 volts direct current, while the other generators are to be wound for three-phase, 60-cycle current at 11,000 volts working e. m. f. between terminals.

A sectional view of the boiler house is given in Fig. 5. The specifications call for inclined water-tube boilers designed for a working steam pressure of 200 pounds per square inch. These are to be fitted with mechanical stokers for burning either soft or hard coal. The equipment is to include 24 boilers each of approximately 6,000 sq. ft. of actual water-heating surface, excluding the superheaters. On the basis of 10 sq. ft. of water-heating surface for one boiler

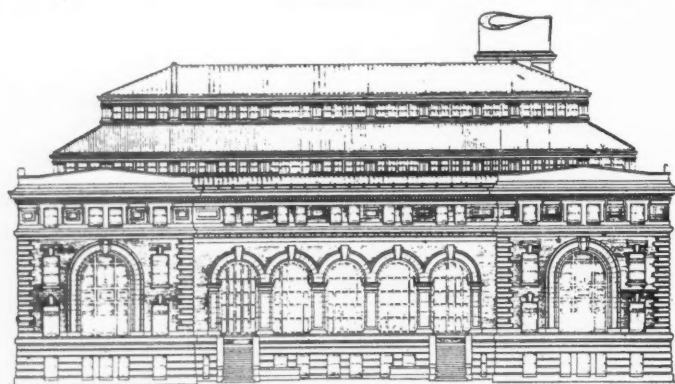


FIG. 2.—FRONT ELEVATION OF POWER HOUSE

Manhattan and the Bronx is \$7,567,000, which appears as a total cost per arc lamp of \$352 and per kilowatt of connected load of incandescent lamps of \$153.

*Courtesy of "Electrical World and Engineer."

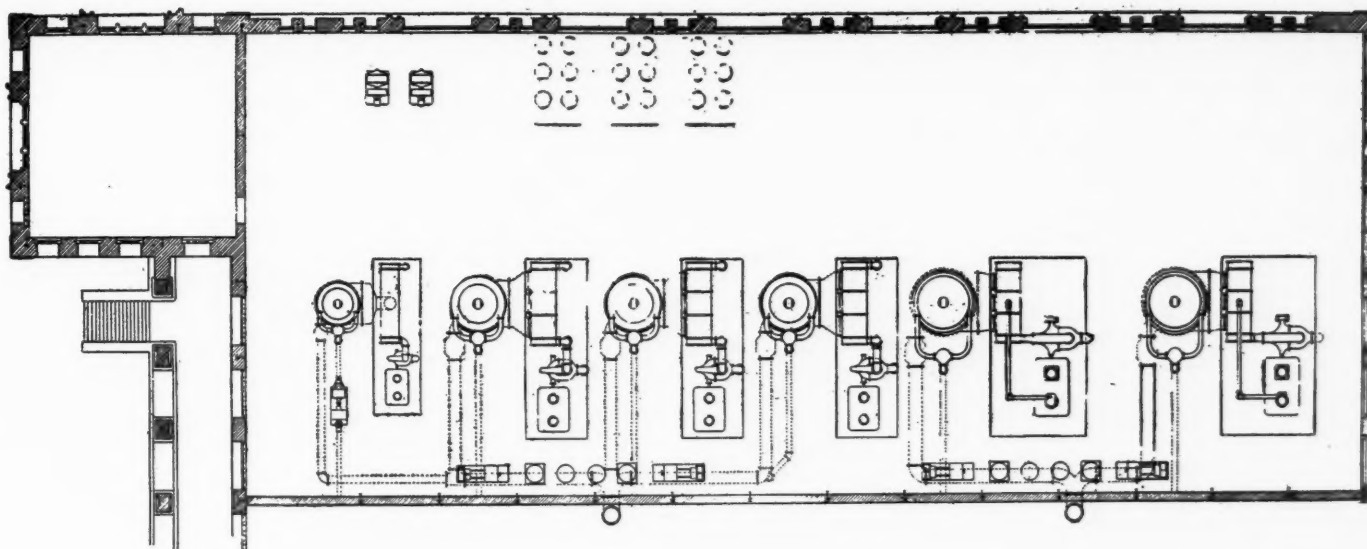


FIG. 3.—PART PLAN OF POWER HOUSE, WITH VERTICAL TURBINES

horse-power, each boiler will be rated at 600 hp. The superheaters will raise the temperature of the steam 150° F. above the temperature of saturated steam at 200 pounds pressure. Storage is to be provided in the yard for more than 20,000 tons of coal, in addition to the storage in the bunkers over the boilers. It is estimated that the total storage capacity will contain sufficient coal to run the plant for six months.

The power will be delivered to nine substations in Manhattan and five in the Bronx, by means of cables run underground in ducts, at 11,000 volts. At the substation, part of the power will be transformed for 7.5 amp. constant-current arc lamps, and the balance will be transformed to 2,200 volts constant pressure for secondary distribution. This latter power will be transformed to 230 volts for delivery to single-phase, three-wire branch circuits in the buildings. In order to eliminate the drop of e.m.f. in the feeders from the central station, pressure regulators will be installed in each substation. No provision whatever is made in the estimates for a storage battery plant as a safeguard against breakdown or accident in the generating plant.

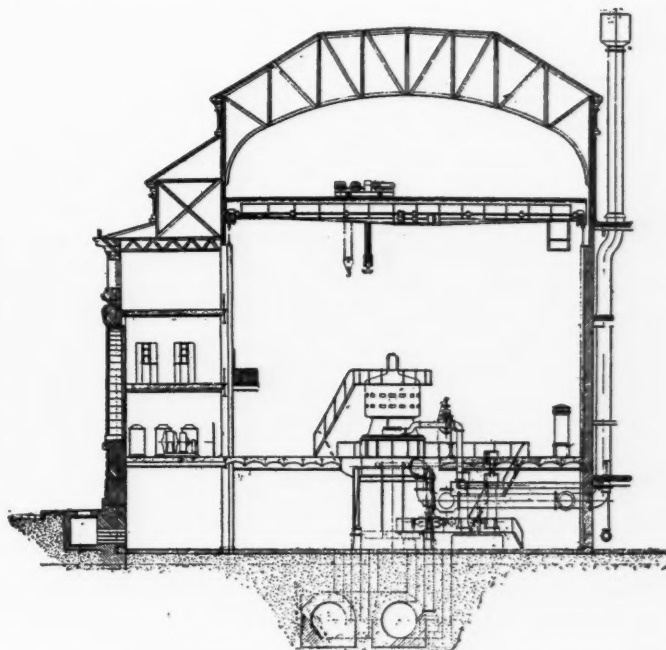


FIG. 4.—PART CROSS-SECTION OF POWER HOUSE, WITH VERTICAL TURBINES

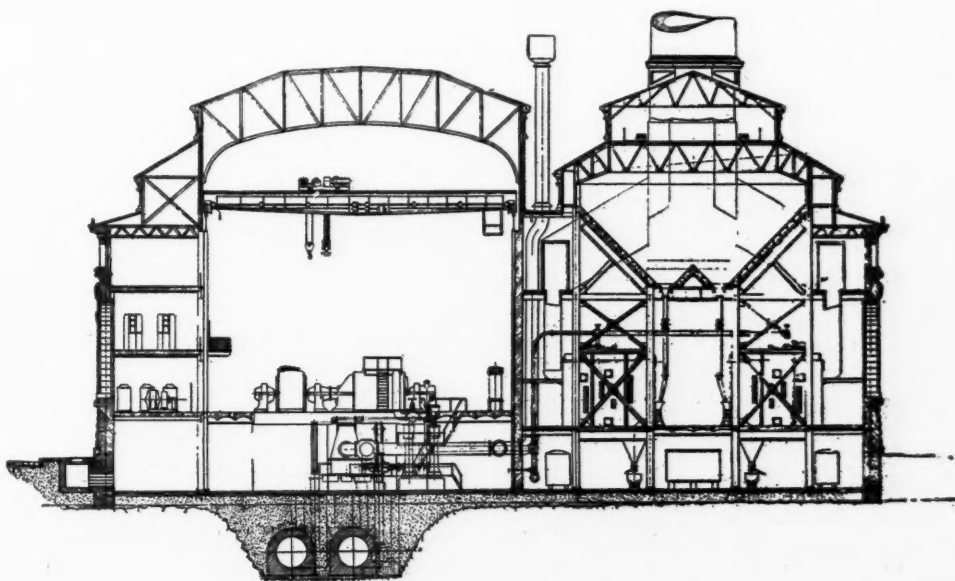


FIG. 5.—CROSS-SECTION OF POWER HOUSE, WITH HORIZONTAL TURBINES

THE CONTROL OF PUBLIC UTILITIES

Regulation Under Legislative Authority of the Charges for the Service Rendered by Those Operating Municipal Public Service Industries

By William H. Baily

THIS digest of a paper, which was read before the Iowa State Bar Association at its meeting in Ottumwa, in July, 1904, is repeated here by request. The references to the Iowa constitution and statutes and other matters of local character will no doubt detract somewhat from what a paper should be to present to a national audience; but in most of the States there are constitutional or statutory provisions similar to those of our State, which will be familiar to those who may desire to apply the suggestions made to conditions in their own cities.

Of the many topics which might be discussed under this title, upon each of which volumes have been written without exhausting the subject, I have chosen that one which has been most frequently the subject of judicial investigation and which I believe to be of the greatest importance from the standpoint both of the lawyer and of the student of civics, namely:

"The regulation under legislative authority of the charges for the service rendered by those operating municipal public service industries."

It is of the first importance and necessity to the well being of every city that it should have efficient street railway, water works and public lighting service, but it is equally important and necessary that the charges for these services should be reasonable. There is a generous and commendable rivalry among cities to procure the location of manufacturing and other industries within its limits. The choice of location by the owner of the prospective factory is often determined as much by the prices which he must pay for water or electric light and power as by bonuses or free building sites.

The statutes of Iowa, Code, Secs. 720 and 725, provide that cities may grant to individuals or private corporations authority to erect and maintain water-works, gas works, heating plants and electric light and power plants; that they may require the owner of such works or plants to furnish to the city or any one applying therefor, subject to reasonable rules and regulations, water, gas, heat, or electric light and power, and shall have the power to regulate and fix the rates or rent for water, gas, heat, or electric light or power, and the rents for meters and other devices used for measuring water, gas, heat, or electric light or power. These powers shall not be abridged by ordinance, resolution or contract.

If the service rendered is good, if the rules are fair, if the service is furnished to all equally and without favoritism or unjust discrimination, and if the prices charged are reasonable, there will be no occasion for the exercise by the city council of the powers here delegated. It is only where there is a difference of opinion between the company and the public as to the reasonableness of the rates charged that the council will attempt to regulate and fix the rents and

rates to be charged for water, heat, gas, or electric light or power. That being true, when the council attempts to act, there will be more or less disagreement and controversy, and it is important that the extent and limits of the power and the principles governing its exercise should be well considered and understood.

At the outset the council may be confronted by the claim that in connection with the franchise granting authority to erect and operate the works there is some contract which abridges the power of the council to regulate rates. I do not believe that a governmental power such as this can be abridged by contract so as to prevent the legislature from thereafter prescribing schedules of rates, or delegating the power to a commission or city council. The Supreme Court of Iowa has in one or more cases intimated that it could not be done. I am aware of no case where the Supreme Court of the United States has said that the power to regulate had been granted away by a legislative contract. Until that court has so decided, we may well rely upon the reasoning of those authorities which hold that one legislature can not deprive a future legislature of the right to exercise a purely legislative or governmental power.

If these powers could be abridged by contract, the statute above referred to and the act of 1888, of which it is a re-actment, expressly provide that the power to regulate and fix rents and rates shall not be abridged by ordinance, resolution or contract; so that there has been no abridgement of the right of regulation in connection with any franchise granted since 1888, whatever language may have been used in the grant. Furthermore, most of these utilities are owned and operated by private corporations, which hold all their franchises subject to the power reserved to the legislature in Art. 8, Sec. 12, of the Iowa constitution, and Sec. 1619 of the Code, to amend or repeal all laws for the organization of corporations, or granting special or exclusive privileges or immunities, and, whenever necessary for the public good, to regulate, withhold or subject to conditions upon its enjoyment, every such franchise obtained, used or enjoyed.

The regulation of rates, therefore, by the legislature, or by a city council under the authority delegated by the Iowa statute is not an act impairing the obligation of any contract, but is the exercise of a right reserved in the contract between the company and the State. This is settled by decisions of the Supreme Court of Iowa and the Supreme Court of the United States.

Following the granger legislation in the early seventies, it was strenuously insisted that the laws which regulated and limited the charges of railroad companies and the owners of warehouses and elevators, water-works, gas works and the like, denied to the owners equal protection of the law, and violated other constitutional guarantees; but the power

of the legislature by itself or through commissions or city councils to regulate the charges of those engaged in public employments, or whose property is devoted to a public use or affected by a public interest, has long been settled.

In the leading case of *Munn vs. Illinois*, 94 U. S., 113, it was held that when one devotes his property to a public use or uses it in an employment in which the public has an interest, he holds it subject to public regulation as to the rate of charge for the service. In *Spring Valley Water Works vs. Schottler*, 110 U. S., 347, it was held that it is within the power of government to regulate the prices at which water shall be sold by one who enjoys the virtual monopoly of sale, and that such regulations do not deprive a person of his property without due process of law; and in another case (*Georgia Ry. & Bkg. Co. vs. Smith*, 128 U. S., 174), it was held that property of a public service corporation is affected with a public use, and the business in which it is used is subject to legislative control, not merely as to provisions for security against accidents and for the convenience of the public, but also to prevent extortion by unreasonable charges and favoritism by unjust discrimination; and that such property is subject to legislative control in all respects necessary to protect the public against danger, injustice and oppression.

It has been, and may again be, objected that this power should be exercised by the legislature itself, and should not be delegated, and especially that to city councils should not be delegated the power to fix rates and prices, since they virtually represent the buyers. In answer to such an objection it was said by the Supreme Court of the United States (*Spring Valley Water-Works vs. Schottler*, 110 U. S., 347): "It is said that appointing municipal officers to fix prices between the seller and the buyer is in effect appointing the buyers themselves, since the buyers elect the officers, and that this is a violation of the principle that no man shall be a judge in his own case. But the officers are selected as the governing board of the municipality, and they are to act in their official capacity as such board when performing the duty which has been imposed upon them. Their general duty is, within the limits of their power, to administer the local government, and in so doing to provide that all shall so conduct themselves and so use their own property as not to unnecessarily injure others. They are elected by the people for that purpose, and whatever is within the just scope of that purpose may properly be entrusted to them at the discretion of the legislature. . . . The municipal authorities have been created a special tribunal to determine what, as between the public and the company, shall be deemed a reasonable price during a certain limited period. Like every other tribunal established by the legislature for such purpose, their duties are judicial in their nature, and they are bound in morals and in law to exercise an honest judgment as to all matters submitted to their official determination. It is not to be presumed that they will act otherwise than according to this rule."

This then is the law: That cities and towns have the legislative power to fix rates to be charged for the services rendered by those operating public utilities;

That the regulation adopted has the force of law, and is the measure of what the company can charge and the consumer must pay;

That the rates must be reasonable, and neither so unreasonably low as to practically destroy the value of the property employed, nor so exorbitantly high as to be in utter disregard of the rights of the public for the use of the service;

That the courts have jurisdiction by injunction or other compendious process to compel obedience to a schedule which prescribes reasonable rates, or to restrain the enforcement of a schedule which is unreasonable or exorbitant;

That when the council has fully and fairly investigated and fixed a rate which it believes to be reasonable, the courts cannot step in and nullify it because, upon a similar investigation, the court would reach a different conclusion as to what would be reasonable; in other words, to justify the interference of the courts, the rates must be so plainly and palpably unreasonable as to make their enforcement equivalent to the taking of property for public use without such compensation as under the circumstances is just both to the owner and to the public.

The power delegated to city councils to fix rates and rents to be charged for the services rendered by public service corporations is one of the most important given them, while the duty which they are called upon to perform is most difficult, and often requires many statistics and the aid of technical skill and training.

In conclusion I wish to call attention to one matter which is worthy the attention of the legislature and of our committee on law reform. We have seen that to city councils have been confided in respect to fixing rates the most important powers and imposed upon them duties very difficult of performance. To act intelligently and do justice they should be informed as to the cost and value of the plant, the expenses of operation, and other cost of rendering the service, and the income received under the existing schedule, and should have many other statistics. To aid the councils to obtain the information necessary to properly perform their duties in fixing rates and equalizing assessments for taxation, a law should be passed similar to those in respect to railroads, telegraphs and telephones, requiring annual reports to be filed with the city and with the State, covering all the items of information necessary not only to fix rates, but make proper assessments for taxation. These reports when compiled and printed under State supervision would be of great value to city officers, to owners of utilities and to students of civics. They would lead to better and more uniform practice throughout the State in establishing rates and in making assessments for taxation of public service industries.



PENNY TELEPHONE SERVICE

The Cheapest Telephone Service in the United States Described by an Expert
—Could Be Used Elsewhere

By Carl C. Curtis Asso. A. I. E. E.

IN the year 1901, The Sandusky Telephone Company completed the rebuilding of its plant, consisting at the time of about 750 subscribers. The work involved almost the entire reconstruction of its wire plant, the installation of new telephones, and the re-equipment of its central office. The system was changed from what is commonly known as the generator or magneto call system, to a modern common battery plant, which is one wherein the subscriber has merely to remove the receiver from the hook, to display a signal in front of the operator and which has all of its batteries at the central office instead of at the subscriber's station.

The rehabilitation of the exchange was productive of better service, and this in turn of a rapidly increasing subscription list. The company was soon confronted with a paradoxical situation, in that its balance sheets began to show that the proportion of gross receipts to operating expenses was slowly but surely growing less. The reason for this anomaly soon became apparent to the management as more and more subscribers became available for connection with one another, there was a corresponding increase in the traffic.

In order to sustain the quality of the service, more and more operators were required to handle the business. The amount of trouble and complaints increasing with the traffic, necessitating more operators, more inspectors, and more clerical help. Crowning all this, the investment per subscriber was likewise increasing, and last but not least, the charge for service being on a rental basis at a fixed rate per telephone per annum, and there being no restriction whatsoever, upon the use of the telephone by the subscriber, the growth in the revenues was not equal to the growth in the expenses. A careful investigation showed that no economy was possible if the quality of the service was to be maintained. Several ways and means were tried for effecting the desired result, but all proved unsuccessful.

After studying the subject for about three years, the company came to the conclusion that the only solution of the problem was the introduction of measured service, it being impossible to retain their business at an increased flat rate, particularly in the face of strong competition. Finally the measured service equipment manufactured by The Controller Company of America was found and formally adopted.

This apparatus is mechanically and electrically different from any heretofore used for a similar purpose in the United States or elsewhere. It differs from the average slot machine or meter in that the subscriber is required to insert a coin, or register on the meter,—as the case may be, in order to flash the signal in front of the operator, the re-

moval of the receiver from the hook availing him nothing. The operator is not required to answer the subscriber, take his order and get the party called for on the line, before asking the subscriber to deposit his money. She knows at once from the fact that the signal appears before her, that the subscriber has performed his duty to the company in this respect. If for any reason she is unable to complete the connection, this act being told by the signals before her, she can by pressing a button provided for the purpose, either restore the coin to the subscriber or set back his meter, according to the character of the equipment and service at the subscriber's telephone.

This method of operation eliminates almost entirely what is known to traffic managers as the "drag" on the service and does not necessitate as many operators for a given number of lines as the other method of operation. This effects a great saving in operating expenses. Incidentally the writer understands it has been estimated that this class of apparatus would save the Chicago Telephone Company from \$40,000 to \$60,000 per annum in operators' salaries alone.

After the discovery of the proper equipment, it remained to determine upon an equitable, profitable, and politic rate schedule. This was worked out as follows: The company has been keeping a careful count of the daily traffic and at the end of the year would divide the total operating expenses by the number of calls handled, this giving the cost per call. This process was kept up for three years. Determined as above, the average cost of a call was found to be considerably less than one-half cent.

In order to check results and to avoid mistakes, the writer made a study of the conditions in other exchanges handling measured service, calling to his aid the counsel and advice of such experts as were available. The greatest difficulty was experienced in securing reliable data. Figures suitable for comparison were hard to obtain. Most of the exchanges investigated were those of large cities, and in using their statistics a liberal allowance had to be made. Inasmuch as measured service is not in vogue to any great extent in cities of a population of 25,000—the population of Sandusky—the matter of traffic on this basis was a wholly unknown quantity and proved a most perplexing problem to determine or to even estimate.

The company has been keeping very careful records both of the revenues and the cost of operation, but owing to the short time its new class of service has been in operation, they are at present writing incomplete. When the exchange was on an unlimited basis, the traffic amounted to ten originating calls per station per day. On the new basis, the number of originating calls per station per day amounts to four, a decrease of about 60 per cent.

The rates for service vary according to the class of line for which the patron subscribes; the amount of guarantee increasing as the number of parties on the line diminishes. The present rates for service average about two cents per call for a guaranteed minimum number. For all calls over and above the guaranteed number—excess calls, as they are ordinarily termed—the subscriber pays one cent each. Inasmuch as the slot machines themselves are made to receive nickels, the subscriber is compelled to use a coin of that denomination or a token of equal size. The company has adopted an authorized token, which it sells to subscribers at a penny apiece. It is expected, however, that whenever a non-subscriber uses the telephone he will deposit a nickel, the difference being refunded to the subscriber at the time of collection. Where meters are used in place of slot machines, the register is operated by a key which can be left in place or removed at will.

The plan has been in vogue but thirty days, and promises to become extremely popular, particularly with the class of people whose demands for the telephone are slight and would not be justified in paying a high flat rate for an unlimited number of calls.

The financial success of the proposition can not be said to have been conclusively demonstrated, but the results visible thus far indicate that it will be ultimately successful. The existing rate schedule has been practically forced upon the company by the tariff and the general attitude of its

competitor, who is giving unlimited service at a lower rate for some classes of service.

It has been asked whether or not penny service could be profitably given in a city the size of New York. To this inquiry the writer can unhesitatingly answer in the negative. He firmly believes that any company attempting to give penny service in a city much greater than 30,000 population would face sure and sudden bankruptcy. The New York Telephone Company could no more afford to give service at the same rates as the Sandusky Company is giving it, than they could give long distance connections with Chicago free of charge to their patrons.

The size of the exchange, the cost of labor, and the general local environment are factors which govern the cost of producing telephone service. Between the cost of labor in New York and the cost of labor in Sandusky there is a wide gap. Operators who in the former city could readily command \$40 per month, would be content with half that sum in the smaller city. Rents, taxes, insurance, and the cost of construction in Sandusky are insignificant as compared to the vast sums which the New York Telephone Company must lay aside for this purpose. The writer, however, does not possess any definite information as to their magnitude, and is therefore unable to say that a rate of ten cents per call in New York for service in Manhattan and the Bronx is exorbitant. He would pronounce it reasonable and just, providing good service were furnished.

SEWERAGE CONSTRUCTION IN NEW ORLEANS

GENERAL SUPERINTENDENT GEO. G. EARL of the Sewerage and Water Board of New Orleans gives the following interesting account of sewerage construction that was made in his city during the year 1904:

"The work constructed to the end of 1904 aggregates 115 miles of sewers and outlets, covers 1881 blocks and includes the greater part of the main sewers and outlets and ten considerable areas of lateral sewers, besides some scattered sewers put in ahead of street paving. Besides these sewers and outlets the pumping machinery contract (for all of the nine pumping stations required for the relifting of the sewage or for its discharge into the river is well advanced, and the buildings and wells for its accommodation are under construction. Scattered building construction of very considerable extent is in evidence in many parts of the city, and the populated area line has now to be drawn somewhat further back from the river than in former maps. On this account it would probably be only conservative to estimate that the mileage of sewers and water mains required to serve this area by 1908 will be nearer 400 miles than the 375 miles estimated a year or so ago, as covering the then populated area.

"However, we have found the construction of sixty or seventy miles of pipe sewers a year to be quite easily practicable in addition to the main sewer outlet and pumping station construction which has been in progress at the same time, and has thus far consumed practically one-half of the

total earnings of the sewerage contractors to the end of 1904, which earnings were in round figures \$1,823,000. In other words, over 100 miles of pipe sewers are constructed and about 285 miles still remain to be built. The 100 miles have been scattered in every part of the city, but have included the main areas of heavy traffic and of difficult underground and paving conditions, at an average cost of about \$9,000 per mile. This would indicate a completion of over 40 per cent in value of the sewerage system required to cover the built-up area of the city. The remaining 285 miles should cost considerably less per mile.

"The prospect, therefore, of continuous prosecution of sewerage construction and of the completion thereof by 1908 at a fairly moderate cost, appears to be favorable.

"A part of the main sewer work has shown greater difficulty than was anticipated, but the contractors having it in charge have thus far met every obstacle successfully, and as a whole deserve great credit for the work which they have accomplished, and it seems now certain that the whole of the main sewer work will be completed during 1905. A part of it, however, will not be completed until the fall, and the delay in this respect will delay the completion of the electric connections to a part of the relifting pumping stations, and it will therefore be impossible to put the sewers draining to such pumping stations into operation until about the end of 1905 instead of the summer of 1905, as had been first contemplated."

SMOKE AND ITS ABATEMENT*

How a Live Western City Settled the Smoke Nuisance—Description of the Department and Its Methods

By Chas. H. Benjamin M. A. Soc. M. E.

THE smoke nuisance has long been one of the bugbears of living in the middle West and is now rapidly becoming an important factor in the East.

The fact might as well be recognized at once that the supply of so-called smokeless fuels, anthracite coal, petroleum, natural gas, etc., is limited and will not begin to satisfy the demand. The supply of bituminous coal on the other hand is practically unlimited, and it is doubtless the fuel of the future. The abundance of it, its cheapness and the readiness with which it burns, even with a poor draft, combine to make it a most desirable fuel. This granted, the further fact remains that it will be burned to a larger and larger extent in the East as well as in the West and that no legislation can prevent this. Just as anthracite coal becomes more scarce and its price increases, just as surely will its place be taken by the cheaper and more abundant fuel.

The problem for our engineers and lawmakers is not how to prevent the burning of soft coal, but how to burn it in such a way that the combustion shall not be a public nuisance. The present discussion will then be confined to the problem of abating the smoke from bituminous coal. The word abatement is chosen with a reason and the terms smoke prevention and smoke burning are discarded. It is not practicable to prevent the evil entirely, but only to mitigate it in a degree. Smoke burning on the other hand is an impossibility under the conditions which usually present themselves.

It will be well at the outset to state three propositions: (a) The smoke from bituminous coal is a nuisance, especially in large cities. (b) Such smoke can in the majority of cases be easily abated. (c) Such abatement can be made a source of profit to the owner of the plant as well as to the community. There need be no difficulty in establishing these propositions by precept and by example.

Objectionable black smoke is due to the presence of hydrocarbons in the fuel and is produced as follows: The hydrogen and carbon compounds in the coal are driven off as gas by the heat at a comparatively low temperature, and may escape unburned. In this condition they would not constitute smoke in the common sense of the term. If heated to a sufficiently high temperature in the presence of air they burn with a yellow flame. If the air supply is insufficient, is poorly mixed with gas, or if the temperature is lowered in any way, combustion is checked and carbon is deposited in the form of soot or carried off with the gas as smoke.

It is difficult to form any estimate of the amount of damage inflicted by soft coal smoke in a city like Pittsburg or Cleveland, but it probably amounts to hundreds of thousands of dollars annually.

The abatement of smoke is in principle extremely simple, but presents some difficulties in the practical application. Only three conditions are necessary for complete combustion, the proper temperature, the proper air supply, a thorough mixing of the air and the hydrocarbons. The last condition is as important as any and is one too often neglected. It is this condition which gives the gas or liquid hydrocarbon an advantage over the solid, since the atomizing of the former by the steam or air jet insures the most intimate contact between the air and the fuel. The use of pulverized coal in combination with air or steam is a close approximation to the above, and, when properly managed, gives good combustion, no smoke and a high efficiency. The cost of pulverizing and the impracticability of storing pulverized fuel have so far hindered the more general adoption of this process, except for metallurgical work.

When coal in the ordinary form is used as fuel, smoke abatement involves some means of varying the coal supply and the air supply according to the demands made upon the boiler. When ordinary hand firing is resorted to, the great irregularity of the coal supply will cause poor combustion and smoke unless the air supply is varied to correspond. Steam jets are frequently employed under these circumstances, and, if properly put in, will improve the combustion by drawing in additional air over the grate and mixing it with the products of combustion in front of the bridge wall. The steam jet should be semi-automatic, the steam and air being turned on by the opening of the fire door and gradually closed off by a dash-pot attachment.

The best solution of the smoke problem, so far, has come from the introduction of mechanical means of handling the coal, which give a uniform feed to the fuel and a corresponding delivery of air for combustion. The use of mechanical stokers has been brought about by the natural demand for machine handling in large power plants as more economical than human labor, rather than by a philanthropic desire to benefit the community.

Stokers may be divided into three principal classes: Inclined, shaking grates—traveling or chain grates—and underfeed stokers. The inclined grate, as exemplified in the Wilkinson, Brightman and Roney stokers, has a hopper in front and slopes down and back, having a clinker grate just in front of the bridge wall, while the double incline, as in the Murphy and Detroit stokers, has a magazine on either side and slopes in two planes parallel to the axis of the boiler, meeting in a clinker grate at the bottom. The principle of action is practically the same and involves the slow

*A paper read before the American Society of Mechanical Engineers recently held at Scranton, Pa. Mr. Charles H. Benjamin, the author, is Superintendent of the Smoke Prevention Department of Cleveland, O., a Member of the American Society of Mechanical Engineers, and Professor of Mechanical Engineering, School of Applied Science, Cleveland.—[EDITOR.]

coking of the coal on a dead-plate, the pushing forward on to the top of the incline and the gradual descent, impelled by oscillation of the grate bars, until the combustion has left nothing but ash and clinker at the bottom. Air is usually admitted both below and above the grate, and the hydrocarbons which are distilled at the top of the grates pass through the intense heat of the burning coke on their way to the bridge wall and are completely burned. The double incline usually has a revolving clinker bar which disposes of some of the ash automatically, but as a rule both forms need considerable cleaning. When used with a fuel which does not cake or clinker too much and when not crowded too hard these stokers are economical and reduce the smoke considerably. If, however, it becomes necessary to slice and poke the fire on account of caking coal or overcrowded boilers, unburned masses of coal are rolled to the bottom and holes are made in the fire through which cold air rushes. Both of these circumstances make for poor combustion and a smoky fire. As a rule firemen poke the fire on stokers too much, doing more harm than good.

I have seen inclined grate stokers carrying a heavy fire and developing much more than the rated capacity of the boiler with very little slicing and hardly a trace of smoke. Cleaning is usually a source of black smoke for a few minutes, but this is mostly unnecessary if the firemen understands his business and gets his fire ready for cleaning beforehand. I think the middle door in the Murphy furnace is sometimes a disadvantage, as it tempts the fireman to meddle with the fire when he had much better leave it alone.

The traveling or chain grate is rapidly coming into favor as a means of stoking automatically. It consists, as in the Babcock & Wilcox and Green stokers, of an endless horizontal chain running on sprocket wheels and carrying the coal back under the boiler, finally dumping the refuse over the back and into the ashpit. The distilling process and the gradual burning of the coke are much the same as in the stokers just described. In order to prevent waste through the grates the latter are usually quite close, and it becomes necessary to use more draft than with ordinary grates. A damper is used underneath the grate to prevent an excess of air from passing up behind the grate. Some tests recently made by a large corporation which uses a considerable number of the chain grates showed an evaporation of only 5.7 lbs. of water per lb. of coal. An examination disclosed the fact that a large excess of air was passing through the comparatively bare grate at the rear end. The introduction of a damper to regulate this brought about a great improvement. With the same fuel and same conditions as before an evaporation of 8 lbs. of water per lb. of coal was obtained. Intending users of chain grates would do well to bear this in mind. From observations covering a period of several years I have come to the conclusion that this type of grate is the best one yet devised for abating smoke. The fact that it is horizontal, so that unburned coal cannot run to the rear end, and the further fact that it is self-cleaning and need not be disturbed by the slice-bar, make it an almost ideal furnace in this respect. If run by an intelligent fireman who understands adapting the depth and travel of the fire to the work to be done, it will also be a very economical furnace.

The underfeed stokers operate on an entirely different principle, the coal being fed in underneath the grate and forced up through a rectangular opening in the center. A forced blast is used and the air for combustion is blown up through the coal, the tuyeres being on either side of the rectangular opening just mentioned. By this arrangement the fresh coal is always underneath and the distilled gases are obliged to pass through an incandescent mass of fuel in company with the air. With a proper pressure of blast perfect combustion is thus almost unavoidable. The ash and clinker are now at the top of the fuel, which forms a gradually rising mound in the center and pushes the clinker over to either side, whence it is removed by hooks through doors at the front. The heat generated is such that the ash generally melts and forms a sheet of clinker which can be easily removed without disturbing the fire. In the American stoker the coal is forced under the grate and up by a revolving screw, somewhat similar in shape to the ordinary gimlet pointed lag screw. In the Jones underfeed stoker a plunger driven by steam operates to feed the coal. This plunger can be arranged to start and stop by hand or to run automatically. My experience has shown the underfeed stoker to be economical in operation and practically smokeless. A criticism frequently made in regard to mechanical stokers is that they will not respond quickly to sudden changes in the load, that it is difficult to keep a uniform steam-pressure under such circumstances, and that for this reason they are not economical. There is some truth in this. It is easy to conceive of circumstances, especially in electric plants, under which it would be difficult to maintain a uniform steam pressure with either the oscillating or the traveling grate.

For regular fluctuation of load, as in electric lighting or railway power-houses, the obvious remedy is the introduction of storage batteries and the provision for ample boiler reserve. Minor fluctuations can be taken care of by the fireman unless they become too numerous or too violent. In the latter case the underfeed stoker with the plunger feed, comes the nearest to satisfying the demand. With the power of instantly regulating the motion of the plunger and the pressure of the blast, it is thus possible to meet emergencies of this kind more promptly than by hand firing.

With the complaint sometimes made that stokers cannot be forced I have no sympathy. With an ordinary inclined grate stoker under a horizontal tubular boiler I have forced a boiler to 25% above its rating with practically no smoke and with an evaporation of over 8 lbs. of water per lb. of bituminous slack. It all depends upon the draft and upon the intelligence of the fireman. It may be stated as a general proposition that smoke abatement means economy in fuel consumption. The proof of this statement is extremely simple: fuel economy results from good combustion, good combustion is accompanied by little visible smoke.

It must be remembered that the converse is not necessarily true, for a smokeless chimney does not always mean good economy. An excess of air may insure entire oxidation of the combustible matter and at the same time so dilute the chimney gases as to cause serious waste of heat.

Whenever for any sufficient reason the stoker can not be introduced, there are other devices which will mitigate the

smoke nuisance considerably and also save fuel. The steam and air blast has already been mentioned. A recent improvement which promises well is the combustion of steam jets at the bridge wall with oil vapor, creating an intense heat at that point and consuming the hydrocarbons as they pass through. The expenditure of oil is comparatively small and considerable economy is said to result.

Brick arches and baffle walls have also assisted in maintaining a high temperature and in properly mixing the gases. The use of a reverberatory furnace or outside oven in which the coal and its gases are thoroughly burned going to the boiler is another satisfactory method of reducing smoke, and may be used with as well as without a stoker. In short, whatever produces good combustion abates smoke. In apartment houses and stores where the boilers are used for heating only and the steam pressure is low, the use of fuels which are comparatively smokeless is about the only satisfactory solution.

If the use of such fuels is supplemented by intelligent and careful firing, the results will be reasonably satisfactory.

Locomotive engines present an entirely new set of conditions requiring treatment radically different from that accorded to stationary plants. Several mechanical stokers have been designed for use on locomotives, and one of these at least has been fairly successful. This application is still in the experimental stage, however, and it is too early to pronounce upon its future.

Most railroad companies have to rely entirely upon the skill of their firemen for abating the smoke nuisance within city limits and some of them have made a great improvement in this respect. Regular and careful observations during the years 1900, 1901, on the railroads entering the city

of Cleveland, showed a reduction in the average amount of smoke emitted by locomotives of from one-half to two-thirds, as a result of the so-called one-shovel system of firing, without any change in the furnace or equipment. The introduction of brick arches also proved to be a good investment.

In closing, I wish to call attention briefly to the legal aspect of the question, although this may not interest engineers as much as does the scientific aspect.

I believe that the municipalities have a right to insist upon the abatement of black smoke by all users of steam boilers, without regard to the purposes for which the steam is used or the means to be adopted for abatement. This, because smoke is a public nuisance and because it can be abated without hardship to the owner of the plant. Nevertheless, when the evil is present and has been present for a period of years, it is not good policy to be too radical in the enforcement of the statutes. The law should be definite and stringent and the penalties adequate, but they should be enforced with discretion by officials who have some technical and practical knowledge of smoke abatement.

It is absurd to talk of putting this matter into the hands of the police or of the health officer. The official having charge of this work should be a trained engineer, if possible a technically educated man, and he should be entirely above graft in any of its disguises.

When the public comes to realize its rights in this matter and that it is under no more obligation to submit to this nuisance than it is to endure bad drainage or filthy streets, laws will be enacted and enforced and the people will wonder that they so long submitted to this unreasonable imposition.

COLLECTION AND DISPOSAL OF GARBAGE

Bids will be received the latter part of August for a ten-year contract for the collection, removal and disposal of garbage and dead animals, for the disposal of night soil and other unclean substances, and for the removal and disposal of ashes. The specification for the contract define garbage as being all household waste, offal, animal and vegetable matter, such as has been prepared and intended for food. The garbage contract also provides for the removal of industrial refuse, such as paper, cans and bottles.

During the summer season, from May 1 to November 1, two collections are to be made weekly. One collection a week is required during the remainder of the year. Collections are to be made from all houses, flats, groceries, commission merchants, public markets, hotels and restaurants. Hotels and commission men will be given daily service. Water-tight wagons must be used, and after dumping they must be washed and disinfected to the satisfaction of the health department.

Unclean substances are to be destroyed by chemical treatment and evaporation, or by cremation, in properly constructed furnaces, in such a way as not to be injurious to

the health and comfort of those living nearby. The city owns a farm on the outskirts which the contractor can use for his plant. A certified check of \$5,000 must accompany the bid, and the successful bidder must give bond to cover the cost of one year's service that he will fulfil his contract.

Indianapolis has never undertaken the collection of ashes heretofore; but since natural gas has become exhausted and the people have returned to a hard fuel basis, it becomes necessary to arrange for this kind of service. The terms of the ash contract are similar to those of the garbage contract. The specifications adopted define ashes as "the unconsumed residue of all material used for fuel and taken from stoves, furnaces or fire places in dwellings, retail stores and public buildings belonging to the city." A small amount of clean sweepings may be included.

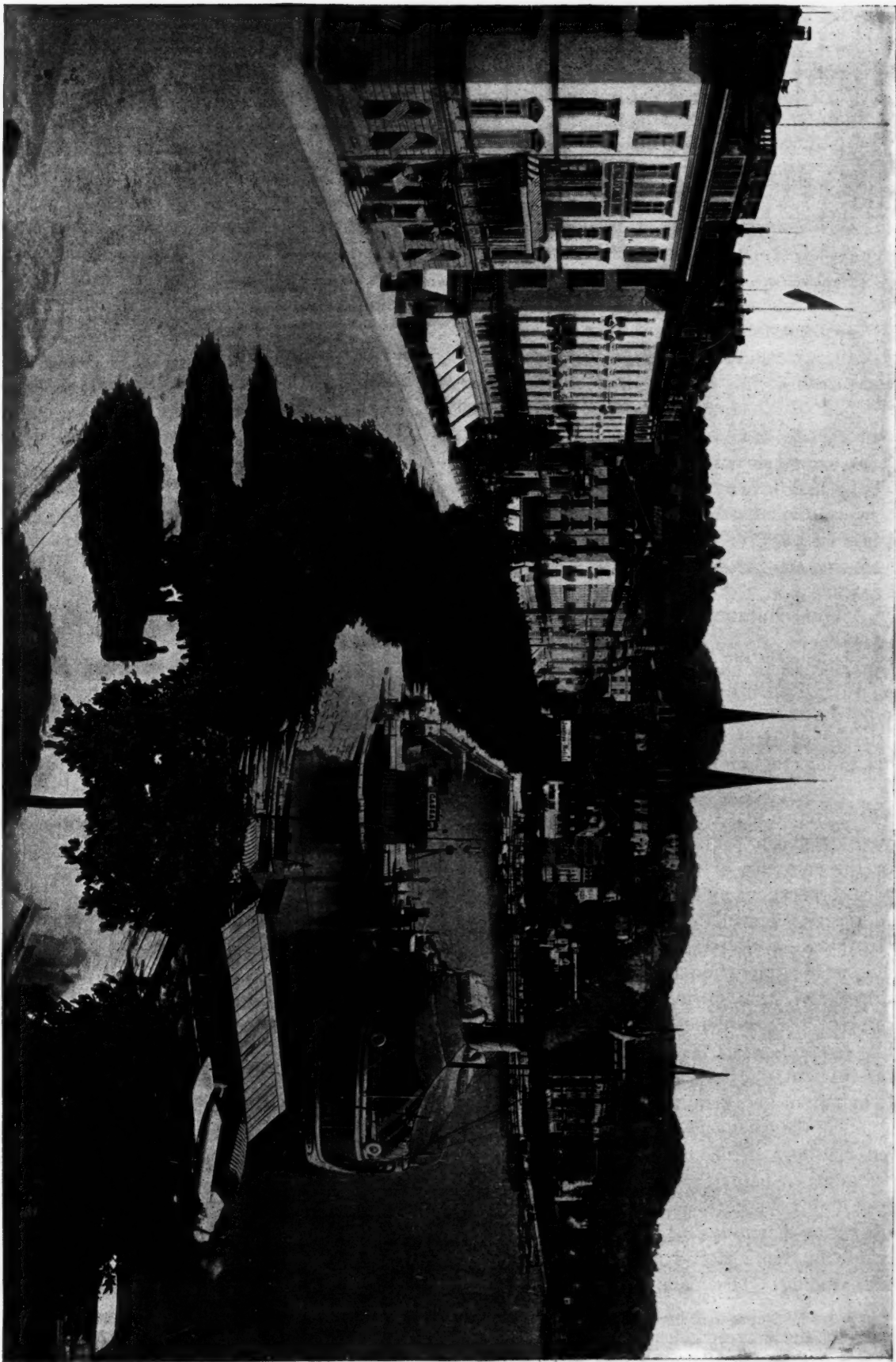
During the winter months when the garbage collector makes one weekly collection, the ash collector must gather up the fuel residue from all places other than factories twice a week. At other times in the year, one collection of ashes is to be made a week. The ashes must be kept in portable receptacle for the collector and the Department shall be the judge.

The Schumann-Platz

LICERNE—A SUGGESTION FOR THE WEST BANK OF THE SCHUYLKILL, PHILADELPHIA

The Schweizerhof Quai

The Quai National





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The Philadelphia Situation

THE developments in the Philadelphia situation since the last number of THE MUNICIPAL JOURNAL show that Mayor Weaver is not to be side-tracked by any party measure nor anything else which will prevent a complete uncovering of the fraud and corruption so long existing in the "Quaker City."

It is to be regretted that Hon. Elihu Root, now Secretary of State, was obliged to withdraw as chief counsel to the Mayor, for the enormity of the crimes committed by the public service corporations and individuals against Philadelphia would seem to demand the services of so eminent a counsel. In this view Secretary Root does not appear to agree, for it is his conviction that Mayor Weaver is so sincere, earnest and steadfast in his purpose that nothing can now prevent the consummation of the work so well begun. The political party of which Mayor Weaver is a member has brought the most powerful influence to bear to dissuade him from uncovering the corruption to such an extent as to affect the party and its standing. These efforts have proved fruitless. Some of the corruptionists are of such high standing in national, state and local politics, and considered so highly respectable that the District Attorney refused to bring an action against them. This episode was made a part of Mr. Root's last advisory letter to the Mayor, and is worth reading. The main portion of the letter is as follows:

"It appears by the correspondence between Judge Gordon and District Attorney Bell that you have caused the evidence of grave crimes by a number of powerful and important persons in the city of Philadelphia to be laid before the District Attorney, and that he has been requested to proceed with proper prosecutions for such crimes either

before the Grand Jury of the county or before a Committing Magistrate, and that he has practically declined to do either, suggesting that you should proceed before a Magistrate as a private prosecutor.

"The reasons which lead the prosecuting officer to take this course I shall not discuss. The resulting fact alone is important for present consideration.

"It is your duty as Mayor of the city to see that the laws are enforced, and when you find that they are being set at naught by criminal combinations, it is your duty to bring the facts to the knowledge of the officer who is elected by the people to prosecute crime, and it then becomes his duty to prosecute, and not yours.

"I think you have done what the law requires of you in this instance, and that if the prosecutions so clearly indicated by the evidence in your possession and now in the possession of the prosecuting officer fail for want of further action, no one can justly say that it is through any failure of duty on your part. I do not think, however, that this settles the question as to your future action. Although the law does not require you to prosecute, it permits you to do so, up to the point where the return of the Committing Magistrate goes into the hands of the District Attorney.

"I think that in default of the action which ought to be taken by the Public Prosecutor, the great interests which you have undertaken to subserve demand that you should nevertheless, exercise your right to go before a Magistrate and carry these prosecutions as far as the law permits you to do.

"In doing this you should, I think, invite the aid and co-operation of the District Attorney, giving him every possible opportunity to take part in the prosecutions and to perform the duty for which he was elected.

"Crimes committed by men who have political power are often sheltered behind official indifference and inactivity, and then some one has to do more than his duty to secure justice, and you will not be the first public officer who has done a great public service against the resistance of those from whom the service ought to come. There is more at stake here than the mere punishment of isolated offenses. There is the question whether your city shall continue to be governed by criminals or shall take its place on the list of American cities capable of honest self-government. To secure the right solution of this question you cannot omit any proper and lawful effort.

"When you have carried the prosecutions, either with or without the District Attorney's aid, through the hands of the Committing Magistrate, you will have done everything within your power, and if the prosecutions then fail after coming within the exclusive power of the District Attorney, and the Augean stables remain uncleared, the people of the city cannot doubt who is responsible for failure.

"It is with very great regret that I find myself unable to proceed further with you in these cases. The assumption of other official duties of which you are aware will prevent me. I have taken very great interest in the cases because I have acquired absolute confidence in the sincerity of your purpose and in your pluck and persistency; and I have a strong desire that the city of Philadelphia, whose history and good name are so dear to every American, shall be re-

lieved from the stain which a corrupt and criminal combination masquerading under the name of Republicans have put upon her.

"I wish you God-speed in your further efforts."

The latest move on the part of Mayor Weaver is the appointment of Major Cassius E. Gillette, of the Corps of Engineers, U. S. A., as a member of the Commission which is to probe the McNichol filtration contracts and other public work done in the last few years. The appointment of Major Gillette was arranged by Mr. Root, through Secretary of War Taft. Major Gillette is the man who unearthed the greatest scandal in the history of the United States Army—the Captain Carter case at Savannah—and this fact alone is sufficient surety that the work done in Philadelphia will be thorough and comprehensive.

Mayor Weaver deserves the commendation of every good citizen in the United States, and it is to be hoped that his constituents in Philadelphia will sustain him in his efforts to purify the city.

International Association of Fire Engineers

THE new secretary of the Association, Mr. James McFall, makes the following announcement in regard to the next annual convention which will meet at Duluth during the week beginning Tuesday, August 15th:

"By a special arrangement the Western Passenger Association, Trunk Line Passenger Association, Central Passenger Association, Southeastern Passenger Association, New England Passenger Association and the Southwestern Excursion Bureau, members and all delegates attending this convention will be entitled to a rate of one and one-third fare plus twenty-five cents for the round trip, on the certificate plan.

"This plan will become effective only when evidence is presented to the joint agent at Duluth showing that one hundred or more persons have been actually in attendance at the meeting. For this reason delegates are urged to be sure to take a receipt from their local agent showing that they have purchased one full fare ticket to Duluth. By depositing this receipt with the secretary upon arrival at Duluth the same will be endorsed and duly presented to the joint agent, and if there are as many as one hundred in attendance you will be entitled to the one-third rate when you purchase your return ticket. Failure to take a receipt from your local agent will cause you to pay full fare both ways. Tickets will be on sale from the 12th to the 18th of August, inclusive. The return passage must commence not later than August 23d. Special arrangements may be made by which an extension of time on the return limit may be secured in order to attend the Lewis and Clarke Exposition at Portland, Ore. The fare for the round trip from Duluth to Portland is \$56."

For further information you should address the secretary, Mr. James McFall, Roanoke, Va.

Needs Municipal Ownership

COMMISSIONER OF PUBLIC WORKS VAN DER NAILLEN, JR., of San Francisco, recently made a visit to Seattle, Wash., for the purpose of studying the problem of municipal ownership of water and lighting systems.

Mr. Van der Naillen, Jr., is a strong believer in municipal

ownership, and declares that the question will be a vital issue in the coming municipal campaign in San Francisco. He said that the graft in San Francisco is eating the heart out of that city, and that in every contract let for public work the administration gets a rake-off or benefit of some kind.

"The labor unions are responsible for the present conditions in San Francisco," said the Commissioner. "Unions were never organized to handle governments. The fight in the coming election will be waged in the hope of wresting the government from the hands of the combine which now enjoys a monopoly of the profits accruing from public works and patronage. These are so distributed as to do the machine the most good and make it powerful.

"The water system of San Francisco is yielding three times the money that the Seattle system earns. The people here pay but one-third the amount that San Franciscans pay for water. This fact is evidence alone of the value of municipal ownership of such utilities.

"In San Francisco we need honest officials above all else—men who are of strict integrity, as well as capable of administering public affairs. If we can elect the right sort of officials, the first move will be for the city to get possession of the Geary street car line. The franchise which the city gave twenty-five years ago for this line expires this year. The city, by an expenditure of \$800,000, can put it in first-class shape and operate it so as to render the people a good service and bring in a revenue for the taxpayers."

The belief in public ownership of the Commissioner of San Francisco is not at all unusual. The fact that there are to-day a larger number of municipal lighting plants in proportion to the total number and a larger number of municipal water plants than there were ten years ago is sufficient argument to substantiate the claim that municipal ownership is growing in popularity. The grasping corporation has itself to thank for this situation, for in its greed to get more than what was its just due it has so disgusted the people throughout the country that they are beginning to insist everywhere upon the corporations paying the full value of their privileges.

A Subway for San Francisco

THE street traffic of the city of San Francisco, according to local authorities, has outgrown the surface capacity, and the Merchants' Association of that city, so well and favorably known as a fighter for the city's rights, has invited William Barclay Parsons, the engineer who planned and constructed New York's subways, to visit San Francisco and arrange plans for a similar subway in that city. Mr. Parsons, it is said, has accepted the invitation, and will spend the greater part of the month of August in looking over the situation in order to arrive at a definite conclusion as to the needs. It is expected that this large improvement will lead to others which are very much needed. For example, those interested think that the conversion of Market street and the proposed park pan-handle into one of the most imposing and beautiful boulevards in the world, stretching from the city's water gate at the Ferry building to Golden Gate Park would be a legitimate outgrowth of the transit improvements.

Whether or not the larger improvements are consum-

mated the question how to provide, safely and properly, for the great tide of human travel that ebbs and flows between the business and residence sections of San Francisco has become one of serious importance which must be satisfactorily settled in the near future. One thing is definitely settled, viz: that there will be no noisy and unsightly elevated railways.

Fathering this movement for better transit facilities in the Golden Gate City the Merchants' Association has acted wisely in securing the services of so eminent an engineer as Mr. Parsons, even though it may be at large cost. If all cities were to follow the example of San Francisco in this particular and get the best advice obtainable in the country, municipal mistakes would be less frequent.

Editorial Comment

NEEDLESS DESTRUCTION OF HUMAN LIFE BY TROLLEY CARS.—Trolley cars of Greater New York alone kill on an average of nearly one person every day. Most of these deaths occur in Brooklyn and on those lines in Manhattan which are not equipped with the life saving fender. All the cars of the Brooklyn Rapid Transit Company are equipped with fenders, but they are of a home-made sort which do not save life but more often assist in taking life. There are car fenders made which answer the purpose for which they are used and give perfect satisfaction; one concern known to THE MUNICIPAL JOURNAL has more than 17,000 fenders in daily use on 250 different electric roads throughout the country. These fenders give perfect satisfaction. If the mayors and boards of aldermen of American municipalities had a due regard for human life they would see to it that every trolley company operating within the limits of their cities equipped their cars with a real life saving fender instead of using a home-made substitute.

AS OTHERS SEE US.—The Oakland "Inquirer" has the following to say about the July number of THE MUNICIPAL JOURNAL: "The July issue is filled from cover to cover with suggestions and information of value to civic organizations and municipal officers. In addition to a large number of contributed articles there is editorial comment on literature, municipal topics and news and practice among cities." In the same connection the "Herald," of Bayonne, N. J., says: "THE MUNICIPAL JOURNAL for July is replete with useful information for many officials in all cities. The questions treated are of vital interest, and the publication is thoroughly and handsomely illustrated."

THE VALUE OF STREET CLEANING APPARATUS.—It seems to be the general opinion of street cleaning superintendents that the best results are secured by the use of the hand or patrol system for cleaning certain streets, together with horse or automobile sweepers for certain other streets. It is certainly a fact that busy downtown streets in many municipalities cannot be cleaned in the daytime by the use of machines, and yet the necessity for some system of cleaning during the day is fully recognized. New York, Chicago, Philadelphia, St. Louis, Baltimore, and in fact all of the larger cities employ what is known as the patrol system for the business streets and some the resident streets at a

varying expense per thousand yards. Washington is, perhaps, the cleanest city in the country, and obtains the result at the least expense, and it employs the hand method almost universally, but that is due to the fact that it has a large amount of smooth pavement. It costs a great deal more to clean a Belgian or granite block pavement than it does to clean asphalt, wood, bitulithic or brick, because the first are rough and the others are smooth. On those streets which have little traffic the machine can oftentimes be used to advantage in the daytime, or at least late in the afternoon, but it is generally considered better practice to use the machine at night rather than in the daytime in any part of the city. This is especially true of those streets which have to be cleaned only once a day or every other day. The hand pick-up sweeper is a machine which can be easily operated by one man and is utilized to most excellent advantage in a large number of American municipalities. Many street cleaning superintendents are hampered by political systems and for that reason they are not enabled to form or work a perfect system of their own. When political parties have less to do with the street cleaning forces in this country the streets will be in better condition in so far as cleanliness is concerned.

NO USE FOR ROUGH PAVEMENTS.—The rapid increase in the use of automobiles both for pleasure and business is hastening the day when rough pavements, such as granite and Belgian block, will no longer be laid in American cities. There was a time when this form of pavement was very acceptable because of its durability and because it was about the only form of permanent pavement to be used, but the inventions in smooth pavements, such as wood block, bitulithic, asphalt and brick, have practically made the rougher form of pavement unnecessary. The time was, also, when Belgian and granite block pavements were considered the only form of pavements that would sustain a heavy traffic, but the use of asphalt on Broadway—while expensive—and the recent introduction of creosote-resinated wood block in New York and Brooklyn has disproved this theory. So far as the average citizen is concerned the smooth pavement is the only one that should be used, for the reason that it is more sanitary and better adapted to street traffic. It is to be hoped that the number of square yards of rough pavement will grow less and less with each passing year.

BETTER REGULATIONS FOR THE TESTING OF DISINFECTANTS REQUIRED.—Anyone who is at all conversant with the organization or administration of the state and local health boards knows that they have many weak points. One of the ways in which the health department of the nation, state and municipality could be materially strengthened is suggested by the recent action of the British Parliament in establishing a standard for the testing and use of disinfectants. By this test it is not meant that some particular brand of disinfectant is set up as the proper standard by the government nor its sale promoted, but rather an examination of all disinfectants that are placed for sale as will reveal their quality and efficiency for all purposes to which they may be applied. In the making of such comparative tests the questions of time, age of the culture, the choice of the medium and the re-

action of the same, the temperature of incubation, the temperature of medication, variations of vital resistance of the same species, variations in vital resistance of different species, as well as proportion of culture to disinfect should be carefully considered. This is a question which should undoubtedly receive the early attention of boards of health of whatever rank, and THE MUNICIPAL JOURNAL would respectfully urge upon health officers whether of municipality, state or nation to take the matter under consideration for the purpose of bringing about an early and radical improvement in the present bad conditions.

NEED OF HOSPITAL FOR CONTAGIOUS DISEASES.—In his last annual report to the Mayor and City Council of Rockford, Ill., Dr. Emil Lofgren, Commissioner of Health, has this to say about the establishment of a municipal hospital in his city for the treatment of contagious diseases: "I believe that as long as there will be contagious diseases in the city, our city ought to have a small municipal hospital where all these contagious diseases could be brought and treated by their own physician if patients so desire it. It would prevent hardships among many people. Should a contagious disease break out in a family the mother or someone else could go with the patient to this hospital and the homes left by the patients could be fumigated, and the family would not be compelled to undergo the hardships which a rigid quarantine causes. For cases developing in boarding houses this would be very good." The suggestion made by Dr. Lofgren is not only worthy of acceptance by the authorities of his city, but should be heeded by every city of 20,000 population and over in the country which does not possess such a hospital.

Personalities

—Mr. Martin Sutz has been appointed city engineer of Celina, O.

—Mr. J. R. Farrell has been appointed city clerk of St. Joseph, Mo.

—Mr. R. O. Danenhower has been appointed city engineer of Little Rock, Ark.

—Mr. John F. Skinner has been appointed principal assistant city engineer of Rochester, N. Y.

—Mr. C. S. Alverson has been appointed superintendent of the water department of San Diego, Cal.

—Mr. Charles S. Ferguson, city engineer of Lorain, O., has resigned, and is succeeded by Mr. J. B. Nichols.

—Mr. J. W. Johnson has been appointed superintendent of the municipal water-works of Oklahoma City, Okla.

—Mayor James G. Cutler, of Rochester, N. Y., has been initiated into the mysteries of fraternity and has become an Elk.

—Mr. George Myers, formerly with the Atchison, Topeka and Santa Fe Railroad, has been appointed city engineer of Iola, Kan.

—Mr. William E. Maher has been appointed chief of the bureau of highways of Philadelphia, Pa., and succeeds Mr. William H. Brooks.

—Mr. G. F. Ashton, city engineer of Salem, Mass., and Miss Helen Archer, daughter of Mr. and Mrs. C. F. W. Archer, Salem, were married on June 28.

—J. Davis Reed has been elected mayor of Portsmouth, Va., to serve the three years' unfinished term caused by the death of the late Hon. J. Thompson Baird.

—Mr. W. A. Clement has been appointed city engineer of Vancouver, B. C. He has for some time been connected with the engineering department of Toronto, Ont.

—Mr. Charles H. Ladomus, city engineer of Chester, Pa., for five years and borough engineer of Ridley Park for twelve years, died recently at his home in Ridley Park.

—Mr. R. R. Fardwell, who was connected with the civil engineering department of the Louisiana Purchase Exposition, has been appointed sewer commissioner of St. Louis, Mo.

—Mr. F. P. Stearns, chief engineer of the Metropolitan Water and Sewerage Board of Boston, Mass., has been given the degree of Master of Arts from Harvard University.

—Mr. Orville J. Whitney succeeds Mr. Fred W. Gow as superintendent of the water-works of Medford, Mass. Mr. Whitney is a graduate of the engineering department of Tufts College.

—Mr. Charles S. Farnham, assistant city engineer of Hartford, Conn., has resigned to become instructor in the Sheffield Scientific School of Yale University, from which he graduated in 1902.

—Mr. R. T. Fox, formerly with the street cleaning department of New York, N. Y., has been appointed superintendent of street cleaning of Chicago, Ill. Mr. Fox was in charge of the street cleaning system inaugurated by the down-town merchants of Chicago, owing to the city not doing the work.

—Mr. H. L. Weber, city engineer of Richmond, Ind., for eleven years, has been appointed chief engineer of the Ft. Wayne and Wabash Valley Traction Co. and of the Ft. Wayne, Bluffton and Marion Traction Co. His headquarters will be at Ft. Wayne, Ind. He is succeeded by Mr. Fred Charles.

—Mr. Morris R. Sherrerd, engineer and superintendent of the water department of Newark, N. J., has been appointed city surveyor and chief engineer of the board of public works of that city. Mr. George Sanzenbacher succeeds Mr. Sherrerd as superintendent of the water department. Mr. Louis C. Dittler has been appointed engineer of the street department.

Convention Dates

August

—League of American Municipalities, Toledo, O., August 23-25. John MacVicar, secretary, Des Moines, Ia.

—International Association of Fire Engineers, Duluth, Minn., August 16-19.

—National Firemen's Convention, Kansas City, Mo., August 29-31.

—International Association of Municipal Electricians, Erie, Pa., August 23-25. F. P. Foster, secretary, Corning, N. Y.

—American Public Works Association, Chattanooga, Tenn., August 30-31. W. H. Flint, secretary, Chattanooga, Tenn.

September

—American Society of Municipal Improvements, Montreal, Can., September 5-7. George W. Tillson, secretary, Municipal Building, Brooklyn, N. Y.

—New England Water-Works Association, New York, N. Y., September 13-16. William Kent, secretary, Narragansett Pier, R. I.

October

—American Civic Association, Cleveland, O., October 4-6. Clinton Rogers Woodruff, secretary, 121 South Broad street, Philadelphia, Pa.

December

—American Economic Association, Baltimore, Md., December 26-30. Frank A. Fetter, Morrill Hall, Ithaca, N. Y.

Shade Tree Ordinance *

ALMOST every city in California is wrestling with the shade tree problem, and none of them have solved it satisfactorily, so far, says the *Pasadena Star*. The trouble seems to be with the State laws apparently, for they do not give power enough to the cities to provide for uniform systems. In some of the Eastern cities the work has been done properly, though in but few instances. Shade trees are more important perhaps in California, but there has been success so far. Possibly the only way to get a uniform and artistic system is to take the money from the general fund, or from a special tax. When they are planted under the tree planting act the results are more or less unsatisfactory and the cost is great.

The city of Pomona has enacted an ordinance which seems to cover the case very well—will suffice until more effective laws are adopted, or until cities are enabled to vote a special tax for tree planting. The Pomona ordinance does not secure uniformity at the start, but will bring it about in time, and none of the existing shade trees will be destroyed until provision is made for others to take their places. The principal features of the ordinance are as follows:

Section 1. No shade trees shall hereafter be set out by any property holders in the City of Pomona, except in accordance with the regulations hereinafter expressed by this ordinance, and then, only upon the written consent of the street superintendent.

Section 2. It shall be lawful for the property holders upon any given street or a majority of them, to select by petition any approved variety of shade tree, which, if satisfactory to the Board of Trustees of the city of Pomona, shall be designated by a resolution of said Board of Trustees, and shall thereafter be the only kind of shade tree to be planted on such street.

Section 3. If the property holders along any given street shall fail for the six months next after the adoption of this ordinance to make the selection provided for by "Section 2" hereof, then it shall be the duty of the Board of Trustees of the city of Pomona to select, by resolution, a variety of shade tree for said street, which shall thereafter be the only variety which shall be planted on such street.

Section 4. No shade tree shall hereafter be planted nearer than eight feet to the outside line of any alley, nor nearer

than four feet to the line which would be made by continuing the property line of any street.

Section 5. It shall be the duty of the Board of Trustees of the city of Pomona at the time of adopting the resolution provided for in "Section 2" or "Section 3" of this ordinance, to define the limits of the street to which this ordinance shall apply, and also to specify the distances at which said shade trees shall be set from each other, which shall not be construed to require the removal of any trees heretofore planted and growing.

Section 6. The term of two years from and after the date of this ordinance shall be allowed to the property holders on the streets of the city of Pomona in which to set out shade trees in accordance with the provisions of this ordinance, and thereafter, it shall be the duty of the Board of Trustees to cause such trees to be planted and the cost thereof to be assessed upon the property in front of which trees are so planted.

Section 7. Any person or corporation violating any of the provisions of this ordinance is guilty of a misdemeanor, and upon conviction thereof shall be fined in the sum of not less than five dollars (\$5.00), nor more than twenty-five dollars (\$25), or shall be imprisoned in the city jail of the city of Pomona for not more than thirty days (30); or by both such fine and imprisonment; and every judgment of fine for violation of any provision of this ordinance shall direct that in default of the payment of such fine, or any part thereof, the person shall be imprisoned in the city jail of the city of Pomona until the fine is satisfied, in the proportion of one day's imprisonment for every two dollars (\$2.00) of such fine remaining unpaid.

HEIGHT OF BUILDINGS IN BUDAPEST.—In streets not more than 10 meters (32.8 feet) wide private buildings may not exceed three stories above the ground floor, say 20 meters (65.6 feet); in streets 15 or more meters wide (49.2 feet or more), four stories are allowed, with a height of about 25 meters (82 feet). The height of any public building or specially fitted private house may be increased 3 to 6 feet by a special permit from the city authorities. The particular reason for placing the foregoing limits on the height of buildings is not given, but the ordinance fixing them is dated January 1, 1894, and copies can be purchased of Legardy Brothers in this city for 2 crowns (say 41 cents).

NARROW STREETS PREFERRED.—City Engineer J. D. Sherwood, of Spokane, Wash., prefers narrower residential streets. In plotting out two sections of the city for acceptance by the council he has reduced the width from sixty to fifty feet. Mr. Sherwood said: "Experience has shown that a driveway of thirty feet is the best except on business streets bearing a heavy traffic. Wide streets make much more dust than narrow ones and cause each residence to become a veritable dust shop, which requires extra labor and care for busy housewives. The wide streets are not all used for driveways. Only a narrow portion in the centre is used, and the rest is a dust or mud producer. If the driveway is narrow every portion is utilized and it is more easily cleaned and sprinkled." He also advocates a highway constructed on a perfect arc and with parking on each side.

* From "Pacific Municipalities."

LEAGUE OF AMERICAN MUNICIPALITIES

Next League Convention to Be Held at Toledo, O., August 23-25—Splendid Program Arranged

By Secretary MacVicar

THE next meeting of the League of American Municipalities will be held at Toledo, O., August 23d, 24th and 25th. The executive committee, which consists of Wm. C. Crolius, president, Joilet, Ill.; R. G. Rhett, Charleston, S. C., George Stewart Brown, Baltimore, Md., and J. E. McCafferty, Wilmington, Del., vice-presidents; John MacVicar, Des Moines, Ia., secretary; Wm. D. Morgan, Georgetown, S. C., treasurer; Henry Bohl, Columbus, O., W. H. Baker, Lockport, N. Y., Louis Betts, St. Paul, Minn., W. M. Drennen, Birmingham, Ala., Silas Cook, East St. Louis, Ill., and M. A. Brouse, Kokomo, Ind., trustees; has sent out the following invitation to mayors, Aldermen, councilmen and city officials:

"Supplementing the invitation already extended by the city of Toledo, the Executive Committee of the League of American Municipalities extends to you a cordial invitation to attend and participate in the deliberations of the Ninth Annual Convention to be held at Toledo, O., Aug. 23d, 24th and 25th, 1905. It is our desire to have every progressive municipality in the United States and Canada, whether members of the League or not, represented at this convention. Your presence will enable you to exchange ideas and experiences with those holding positions similar to yours in other cities and will afford you an opportunity to learn of the latest and best appliances and materials used in municipal work. The convention will be composed of practical men, those who have had actual experience in municipal work and understand conditions that must be met in the solution of the various problems involved in the administration of civic affairs. An interchange of experiences, ideas and knowledge between such men must necessarily be of material benefit to the municipalities they represent."

OBJECT AND MEMBERSHIP OF THE LEAGUE

"The object of this organization, which shall be known as the League of American Municipalities, shall be the general improvement and facilitation of every branch of municipal administration by the following means: First, the perpetuation of the organization as an agency for the co-operation of American cities in the practical study of all questions pertaining to municipal administration; second, the

holding of annual conventions for the discussion of municipal affairs; third, the establishment and maintenance of a central bureau of information for the collection, compilation and dissemination of statistics, reports and all kinds of information relative to municipal government.

"Any municipality or any city official or ex-city official may become a member of this organization. Each and every member shall pay an annual membership fee as follows:

"Cities under 10,000 population, \$10.00; between 10,000 and 25,000, \$20.00; between 25,000 and 50,000, \$30.00; between 50,000 and 100,000, \$40.00; between 100,000 and 200,000, \$50.00; over 200,000, \$60.00; individual membership, \$5.00.

"The League provides a department of municipal statistics and comparative information available to each official of every membership city. Certainly the most conscientious official cannot but feel justified in appropriating, for the purpose of receiving information on municipal affairs, the small sum annually necessary to cover the League dues, which not only puts the Bureau of Information at the disposal of each of the city officials, but also covers the annual subscription to the League Bulletin and convention proceedings. The Bulletin will be mailed to each official and head of department of every membership city."

REDUCTION IN RAILROAD RATES

"The reduction in fare is conditional on there being an attendance at the meeting of not less than 100 persons who held certi-



MAYOR WM. C. CROLIUS
President of the League

icates showing payment of full first-class fare of not less than 75 cents to place of meeting. Going tickets in connection with such certificates are issued for return, may be sold only on three days, and, if a Sunday intervenes, four days, immediately preceding the agreed opening date of meeting, and during the first day (Sunday included) of the meeting; provided, that when meetings are held at distant points to which the authorized limit is greater than three days, tickets may be sold before the meeting in accordance with the limits shown in regular tariffs. Deposit the certificate not later than the 24th with the Secretary of the League for necessary endorsement and vise of special agent. Twenty-five cents will be collected for vise of each certificate. Receipts for fare

paid will not be accepted in lieu of certificates. On presentation of the certificates, duly validated, not later than the third day following the agreed date for adjournment (Sunday not to be counted as a day), the agent at place of meeting will return the holder to starting point, at one-third fare."

PROGRAM:

President's address.

"Municipal Finance and Accounting," by *L. G. Powers*, Chief Statistician, Department of Commerce and Labor, Washington, D. C. Discussion led by *Louis Betz*, Comptroller, St. Paul, Minn.

"St. Louis' Municipal Lighting Plant," by *J. W. Hood*, Chief Engineer, St. Louis, Mo.

"How to Tax Real Estate," with stereopticon views, by *Peter Witt*, City Clerk, Cleveland, Ohio.

"Workhouses," by *Frank R. McDonald*, Superintendent Minneapolis City Workhouse.

"Municipal Ownership," by *Mayor Robt. H. Jeffrey*, Columbus, Ohio.

"Street Railway Situation in Toronto," by *F. S. Spence*, member Board of Control, Toronto, Canada.

"Abatement of the Smoke Nuisance," by *R. P. King*, Smoke Inspector, Indianapolis, Ind.

"Should Disinfectants be Standardized," by *Wm. S. Crandall*, New York City.

"What the Great Fire has Accomplished for Baltimore," by *Oscar Leser*, Judge Appeal Tax Court, Baltimore, Md.

"Factors in Asphalt Paving Construction, Maintenance and Cost," by *Andrew Rosewater*, City Engineer, Omaha, Nebraska.

"Fire Department Water Supply," by *Chas. A. Hague*, C. E., New York City.

"Street Cleaning," by *Mayor Silas Cook*, East St. Louis, Illinois.

Other speakers to be announced. Exhibits by manufacturers and dealers in municipal machinery and appliances will be an attractive feature of the convention. Applications for space should be made to *J. W. Flowers*, Chairman Committee, Toledo, Ohio.

MEETING OF AMERICAN ROAD MAKERS

'Good Roads' Earle, State Highway Commissioner of Michigan, Has Arranged for the Biggest Convention at Port Huron, August 29th, 30th and 31st

By Our Special Correspondent



HORATIO S. EARLE
State Highway Commissioner

STATE HIGHWAY COMMISSIONER EARLE, of Michigan, who was the first president of the American Road Makers, and who is known throughout the country as the "Good Roads Senator" of that State, has invited the organization to hold its next annual meeting within the bounds of his territory, at Port Huron, on August 29th, 30th and 31st. On behalf of the A. R. M., the President, State Highway Commissioner MacDonald, of Connecticut, has accepted the invitation and, in turn, has invited President Roosevelt and his Cabinet to meet the Governors of all the States together with a large number of good roads experts, not to mention the thousands of the laity who will be present on this occasion to show their interest in the good roads cause.

A UNIQUE FEATURE OF THE PROGRAM

In connection with an excellent program which is being arranged as THE MUNICIPAL JOURNAL goes to press, a unique automobile tour has been provided for, to illustrate what could be done in time of war with the automobiles as a means of general transportation. But it should be remembered also that this will be a practical demonstration of the usefulness of good roads and the hindrance of poor roads.

Commissioner Earle has been authorized by the A. R. M. to issue a general call to everybody within the bounds of

the United States or Canada who may own an automobile to start upon an automobile tour upon such a day as will permit their arrival at Port Huron either on the 29th or 30th of August. It should be understood that it does not matter from what point you start so long as you arrive upon one of the two days mentioned. The conditions as to the start are that a telegram be addressed to Commissioner Earle, care the Harrington Hotel, Port Huron, Mich., stating the exact hour of departure from a given point, and that an affidavit properly executed, stating the time of the start, be brought by the contestant and delivered to Commissioner Earle at the above mentioned hotel immediately upon his arrival at the end of his journey. The distance, time and condition of roads will be duly considered by the judges in awarding the prizes.

A SPECIAL INVITATION TO CITY OFFICIALS

As host of the American Road Makers, Commissioner Earle extends an urgent and pressing invitation to all city officials, including mayors, members of council, boards of public works, park commissioners, city engineers, superintendents of streets, and everybody else who may be interested in the cause of good roads who is connected with any city, town or village government. All will be made welcome.

As a special inducement to those who wish to witness a practical demonstration of road building, Commissioner Earle has arranged for the building of a stretch of two miles of road in the immediate vicinity of Port Huron, so that every phase in the improvement of a rural highway will be faithfully shown. The most improved machinery will be employed in this work and the best talent which the country affords will be utilized in superintending the work, including

such eminent road builders as Commissioner MacDonald, of Connecticut; Col. W. L. Dickinson, of Massachusetts; Hon. Martin Dodge, Director of the Public Road Inquiries; State Engineer Van Alyston, of New York; Commissioners Hunter and Huston, of Pennsylvania and Ohio; Commissioner A. W. Campbell, of Ontario, Canada, and others.

FOR FURTHER INFORMATION

Address Commissioner Earle either at his home, Detroit, or his Department at Lansing, Mich. As soon as the program is fully prepared it will be mailed to thousands of addresses throughout the country and to any address upon request.

Always thoughtful for the economies in such a convention Commissioner Earle has secured the concession of a half-fare, railroad rate plus twenty-five cents, from the Michigan Passenger Association, of which everyone will be glad to take advantage. As it is expected that fully fifty thousand people will be in attendance during the three days' session and as all hotels will be crowded to their fullest capacity, it will be a wise thing to engage your room in advance.

STATE OF MICHIGAN INVITES YOU

Commissioner Earle, in his desire to have a large meeting and make everyone welcome had the State Legislature pass the following resolutions:

Whereas, The first International Good Roads Congress ever held, was held at Port Huron, Michigan, in July, nineteen hundred, and

Whereas, There, the first good roads train was used in the building of sample roads, and

Whereas, This was the beginning of the good roads

work, the result of prior agitation which has led up to the adoption of the State reward plan for good roads in Michigan, and

Whereas, This sample road was built in Port Huron township which was at that time under the statute labor system, and

Whereas, Port Huron township has changed to the cash tax system, and ever since has built a piece of macadam road, and

Whereas, Port Huron township is proud of what they have done, and believe that it is the proper thing to do, desire to show to all the people of Michigan, and as many others as are interested, the beneficent results of such system; so they ask, through a resolution of their township board, seconded by a similar resolution from the city council of the city of Port Huron, praying that this legislature, by concurrent resolution, will invite the American Road Makers, a national goods roads organization founded by Horatio S. Earle, the promoter of the aforesaid congress and originator of the good roads train to meet at Port Huron, Michigan, Tuesday, Wednesday and Thursday, August 29th, 30th, and 31st, nineteen hundred and five to assist us in investigating the cash tax system for roads and celebrate the beginning of State Road Reward Plan also founded in Michigan. Therefore, be it

RESOLVED, That the House (the Senate concurring), does hereby invite the American Road Makers to hold their annual meeting at Port Huron, Michigan, at the time mentioned in the resolutions of the township board of Port Huron township seconded by another by the city of Port Huron.

SMOKE NUISANCE IN VIENNA

THE only reference in the municipal building regulations to the production, suppression, or regulation of smoke in Vienna is as follows:

Chimneys of large smoke-producing plants, and those built for ventilating purposes or for boilers, must be so constructed that they shall not constitute a nuisance for the surrounding neighborhood.

The Austrian industrial law states that—

The approval of the plant shall be necessary in all industries which use specially constructed furnaces, steam machinery, motors, or water-works, or which are likely to become a danger or a nuisance to the surrounding neighborhood by reason of conditions detrimental to health, or on account of methods of operation that are dangerous, or on account of bad smells or unusual noises. Such plants shall not be allowed to be constructed without approval.

In all such plants an official examination of the alleged nuisances must be made and necessary conditions and limitations shall be prescribed in their construction with particular reference to avoiding any detriment to churches, school-houses, hospitals, and other public institutions. Particular care is to be taken also that in the construction of the working rooms danger to the lives and health of workmen shall be avoided.

It is admitted by the authorities of Vienna that the existing regulations are inadequate to overcome the smoke

nuisance. It is contended, however, that up to the present time no smoke-consuming apparatus has been invented that accomplishes the purpose desired. Proper firing of furnaces and the use of good fuel are considered of the highest importance. It has been proposed, therefore, to offer prizes to employees looking after furnaces, the municipality contributing to a fund for this purpose.

In recognition of the fact that the present laws are not sufficient, the following provision has been inserted in the draft of the new building regulations of Vienna:

In smoke-producing plants no danger of fire, or sanitary evil, and no material nuisance to the neighborhood shall be allowed to be created. All plants to be erected in the future are to be so constructed and used that no such annoyances shall exist, and should such annoyances arise the owner of the plant must provide the necessary remedy at his own expense. In case changes are made in the neighborhood whereby a plant already constructed becomes a source of danger from fire, a sanitary evil, or a material nuisance, it shall be the business of the owner of the plant to provide a remedy at his own expense.

If this proposed regulation or a similar one is adopted the authorities will have a far-reaching power to prevent smoke nuisances. The use of hard coal is quite general in Vienna, but the use of coke and gas has recently become considerable.

Chicago—Queen City of the Lakes*

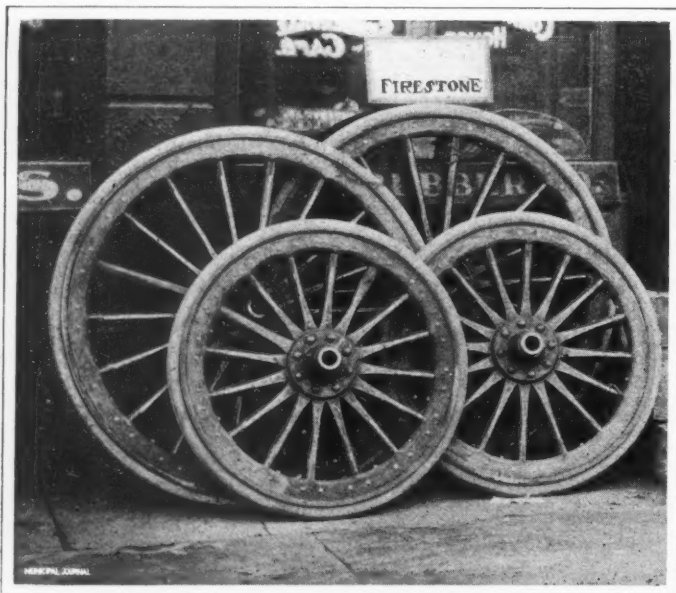
I built a city in my youth
Beside the inland seas,
And there the giant Trade was born
And nursed upon my knees.
I gather, in my busy hands,
The lines of steel that run
O're rock and river, night and day,
Straight on from sun to sun.

The cattle on a thousand hills
Are mine, the world awaits
Each day the tender roasts and steaks
I pile upon its plates.
The roaring tide of commerce ebbs
And flows at my command,
Queen city of the lakes am I,
And mighty in the land.

Syracuse Fire Department Appreciates Rubber Tires

THE City of Syracuse, N. Y., is noted for its efficient fire department, and for a thoroughly competent and progressive fire chief. One of the important improvements which he has instituted is the equipment of the fire apparatus with rubber tires. At the present time five engines, twelve wagons and a truck are using rubber tires. Five other pieces of apparatus are also being equipped, and the new hook and ladder truck, being built for the department by the Seagrave Company, will also be fitted with rubber tires.

As Chief Quigley expressed the matter to a MUNICIPAL JOURNAL representative, the use of rubber tires by the fire department represents an important step in advance. As a



SYRACUSE FIRE DEPARTMENT WHEELS AFTER EQUIPMENT WITH FIRESTONE SIDE WIRE TIRES

simple matter of economy, the tires are an excellent investment, paying for themselves in a short time by the reduction of wear and tear on the apparatus itself. Rubber tires which have seen hard service on their engines for the past two years, show no perceptible wear, and the reduction of

strain on the apparatus, together with the increased speed, and possibility of turning corners safely without slowing down, have made rubber tires popular both with the department officials and the firemen themselves.

A recent accident in the Syracuse department will illustrate the necessity for rubber tire equipment. At the time Engine No. 3 had not been equipped with rubber tires, and in answering an alarm, the driver attempted to take a corner at good speed. The engine was thrown over on its side and the driver was caught underneath, and died on the way to the hospital. The verdict of Chief Quigley and others in the department who looked into the matter was that if the engine had had rubber tires the accident would never have occurred. It takes less to throw over a fire engine than is generally appreciated. A ridge of ice or dirt, a street car track or switch, or even a wet asphalt pavement, will occasionally cause trouble when fire apparatus is traveling at high speed. Rubber tires have proved most efficient in reducing the danger from such sources, and when in addition to this, consideration is taken of the fact that they add to the life of the apparatus, reduce the draft on the horses, and make it possible to cross hose lines without damage, it is not to be wondered at that municipalities are rapidly adopting the rubber tire as standard for the fire department. Chief Quigley stated that the rubber tire which proved the most satisfactory was known as the "side-wire" tire. This tire is specially designed for fire department service, and is used exclusively by the Syracuse department.

The Drainage Problem of New Orleans

IN the last published report of the Sewerage and Water Board, New Orleans, General Superintendent Earl gives the following brief review of the drainage work, showing the amount of drainage construction and expenditure to date, the effect thereof and the status as to further drainage construction under the existing law:

"In that Drainage Report of 1895 it was estimated that the general main drainage of New Orleans could be carried forward to a state of efficiency sufficient to serve present needs for \$8,000,000. The map published with that report showed about 100 miles of drainage canals (of which about twenty miles were high level or leveed outfall canals), and eight pumping stations. The work contemplated for \$8,000,000 including the lining of about twenty-nine miles of the eighty miles of low level canals, the improvement by excavation of the leveed outfall canal, the relief canals and such portion of the low level canals as pass through areas now sparsely settled, and the construction of sufficient pumping capacity (properly housed) to meet the needs of the city in its present stage of development and for amounts of rainfall recurring with sufficient frequency to make their entire and immediate removal necessary.

"The work so far accomplished includes:

"1st. A central electric power station large enough to receive more than double its present equipment of machinery, its present equipment, consisting of some seven engines and dynamos having a combined capacity of 5,700 electric horse power output.

* By Minna Irving, in "Four-Track News" for July.

"2nd. The construction of six pumping stations, with a pumping capacity nearly three times as great, and an efficiency, in actual drainage results, nearly six times as great as the old stations which they replace. At all of these stations provision is made in buildings and foundations for the installation of such additional pumps as will be required later. The present total pumping capacity amounts to a prism of water one-half mile long and ten feet square every minute, while the capacity ultimately recommended in the Advisory Board's report would be a prism of the same sectional area and two miles long every minute.

"3d. Power transmission lines connecting all these drainage stations with the central power station and carrying enough wires for present needs.

"4th. Seventeen miles of masonry, covered and lined canals and two miles of timber lined canals, inside of which masonry lining can be put at any time when funds are available.

"5th. Eighteen miles of earth canals excavated, enlarged and improved.

"6th. Considerable improved pavement over drainage canals. (This has been constructed at a very large expense to the drainage fund, the Drainage Commission having been in a way compelled by the nature of the streets in several cases, to replace mud streets or square block pavements with asphalt after canals were constructed.)

"The cost of all the above to the Drainage Commission was about \$4,750,000, of which amount \$3,900,000 was covered by an allotment of the \$12,000,000 Sewerage and Water Board bond issue, the remaining \$850,000 having come from franchise and other funds which were originally dedicated to drainage construction. After the drainage work was put under the Sewerage and Water Board a further allotment for drainage construction of \$700,000 was made, and with this money drainage work now under contract or to be let during 1905 and 1906 is to be executed. This work will add about two miles to the covered and lined canal system at a cost of about \$190,000, and the remaining \$510,000 is to be expended mainly in the improvement of the low level unlined canals leading to Pumping Stations Nos. 1, 6 and 7, which canals experience has indicated cannot be maintained in effective condition without a lined or partially lined channel to prevent excessive caving and deposit; constant duty pumps at Stations Nos. 6 and 7 are included in this expenditure, and the whole is a work not included in the original \$8,000,000 estimate, because it was believed that these unlined canals would be more easily maintained in effective condition than experience has shown.

"Under the present law probably not more than \$700,000 or \$800,000 further can be appropriated to drainage construction by the end of 1908, whereas something like \$4,000,000 will be required to bring the system up to a point of efficiency now desirable over the whole city.

"This would include:

"1st. The masonry lined main canal leading toward Lake Borgne; 2nd, some fifteen miles more of covered and lined canals in the populated areas of the city; 3rd, the construction of two additional pumping stations, and the installation in them and in the pumping stations already constructed of

about 8,000 cubic feet per second additional pumping capacity; 4th., the installation of such further machinery at the central power station as would be required to operate these pumps; 5th, and finally the excavation or improvement of some twenty miles more of open and unlined canals.

"Clearly these works are not possible of accomplishment with the means available under the law as it now stands. The causes of the increase as above indicated of \$1,450,000 over the estimate of 1895 to bring the main drainage system into thoroughly effective condition are as follows:

"1st. The contemplated construction of some five miles more of lined and covered canals made necessary by the growth and development of certain areas of the city.

"2nd. The expenditure for paving hereinbefore noted.

"3d. The installation of an electrically operated system of pumping stations driven from one central power station instead of independent steam driven stations. This was introduced at a somewhat greater cost than would have been required for independent steam driven plants in order to obtain certain obvious advantages due to the concentration of the whole power producing equipment required to remove storm water at one point instead of having to deliver coal and supplies and send extra forces of men for emergencies to eight widely scattered and rather inaccessible pumping stations.

"4th. The necessity which has developed of at least partially lining the large and deep canals leading to the various pumping stations. Eventually all of the canals (except the high level outfall canals) will have to be masonry lined, but for the present it is impossible to consider this, and no estimate has ever included it."

Canadian Government Railway Returns*

THE minister of railways has announced that the earnings of the Intercolonial Government Railway for the last year fell \$1,500,000 short of expenses, by reason of the bad weather of last winter. The Intercolonial road had an unprecedented experience; in common with the other railroads of the maritime provinces it was practically tied up for two months. During that time the expenses of operation were doubled and trebled by storm after storm, and the same agencies which increased the expenses cut down business and financial returns to almost nothing.

On the Prince Edward Island Railway the returns for the first nine months of the present fiscal year, compared with the same period in the preceding year, fell off \$11,957, and the working expenses increased \$65,289. The cost of removing snow and ice last year was about \$11,000, and this year it increased to \$32,175.

Besides the great expense occasioned by the storms of last winter, the working expenses of the Intercolonial were increased by a general advance in the pay of employees, the increases in some cases amounting to 50 per cent. This does not mean that the wages of the Intercolonial are now higher than on other railroads, but that they were lower in the past. The increase merely means the leveling up of the Intercolonial rate of pay to the standard of other railroads. The Government is not paying an exorbitant

* From United States Consul-General Holloway, Halifax, Nova Scotia.

wage, but a fair one. The increase in the wages amounted to about \$750,000 in the railway year. As a result of this increase, and a small increase in the number of employees, better results have been obtained from the staff. This is particularly noticeable in the mechanical department, where the number of men was increased 20 per cent. and the output of work in some cases increased as much as 100 per cent.

The chief loss in the operation of the Government system or railways was on the Intercolonial road. It was not due to a falling off in the revenue; in fact, the revenue of the system for the first nine months was a few thousand dollars greater than for the same period of the preceding year. Had it not been for the great and largely unexpected increase in the working expenses the increase in the earnings would have gone a long way toward cutting down the deficit on the year's operations. The minister states that the country must recognize that it has the Intercolonial on its hands as one of the pledges of confederation, and that it must be maintained. The time has come when the country must realize its obligation and that the Intercolonial was not built to be a commercial success, but that military considerations influenced the location of the line on the north shore of New Brunswick. Canada built the Intercolonial over a non-commercial route and bonused a short line competitor to it across the state of Maine.

The people of Upper Canada should remember that if the maritime provinces had the Intercolonial, they on their part had the canal system constructed for their benefit. The rates on the Intercolonial are low, but those low rates have been induced in many cases by water competition. They are not for the benefit of the people of the maritime provinces only; the whole country benefits by them. However, the local rates of the road are from 25 to 80 per cent. lower than the local rates charged on railroads in other parts of Canada. Hon. Mr. Emerson said that he thought that in many cases these rates were too low and would have to be raised, not only for the benefit of the road, but for the benefit of all interests. He believed the Intercolonial had passed the stage when it was possible to make both ends meet.

Smoke Nuisance in Germany*

For several years past the State governments of Germany have given attention to the smoke nuisance. The stoppage of the chief source of excessive smoke by training firemen to be more expert and careful has been tried recently, and the formation of smoke can be reduced in this way to a great degree. The proper construction and management of steam boilers and the prevention of explosions has received careful attention through police regulations and continued examinations by official experts. The daily care of boilers, however, has been very often intrusted to ignorant firemen, as the instructions instituted by a few industrial associations has not been adequate, and the owners of steam plants frequently failed to show sufficient interest in the thorough teaching of their firemen. For the purpose of supplying a remedy the Ministry of Commerce and Trade

three years ago instituted "traveling courses of instruction for firemen," by which more than 500 men have been taught.

The instruction is given in fourteen-day courses, and comprises theoretical and practical instruction by an academically trained engineer and a competent fireman. Its object is not only the prevention of smoke, but a safe and economical treatment of steam boilers, so that not only the public interest but that of the owners of boilers is taken into account. These continued courses are given wherever a sufficient attendance can be expected. The State bears a part of the expenses, and from time to time sends out expert firemen to visit steam plants in order to watch the boiler attendants, call their attention to mistakes or defects, and give them practical instruction with reference to firing and safety appliances. Only when the services of the expert are desired for several days does a fee have to be paid. The interest shown in the instruction is constantly increasing, and its value, based upon the results obtained, is more and more appreciated.

City Work Saves Taxpayers' Money

FIGURES on the cost of cleaning the improved streets of Indianapolis under municipal direction for the first six months of the present year ending July 1, prove that the work can be done by the city at a material saving to the taxpayers, as was predicted by Mayor Holtzman at the time the city street cleaning department was organized. Estimated on the cost so far, there will be a net saving of from \$13,000 to \$15,000 this year, as compared with 1904. In addition to this actual saving, fully 40 per cent. more street area has been swept so far this year.

The actual cost of cleaning the streets from January 1 to July 1, 1905, has been \$27,372.20. Of this amount, the largest item is for pay-rolls, \$20,567.93. The remainder, \$6,804.27, has been spent for feed, repairs, insurance and other items of current expense. On this basis, the average monthly expense has been \$4,562.04 and at that rate the street cleaning for the entire year will cost the city \$54,744.48. There may be some slight variation; but those in charge of the work are confident that it can be kept very close to this estimate.

In 1904 the Public Board of Works made allowances to the street cleaning contractor for work aggregating \$68,296.58. Deducting this year's estimated cost on the experience thus far from that amount, indicates that the saving in 1905 will amount to \$13,525.10. The last contract work done in 1904 was the cheapest price ever obtained by the city. In 1903, the street cleaning contractor received from the city for his work \$80,640.45. Compared with this expenditure, the cost in 1905 will be \$25,000 less, the work being done by the city.

This showing is all the more notable when it is considered that the area which is being swept this year is more than 40 per cent. larger than that taken care of by the contractor a year ago. C. A. Garrard, superintendent of the city street cleaning department, says that his schedule calls for sweeping 1,000 squares each night, as against a nightly average of 699 squares covered by the contractor. Each square consists of 10,000 square feet. This area will

* From United States Consul-General Guenther, Frankfort, Germany.

increase from year to year on account of the improved streets that are constantly being completed.

The city council allowed the Board of Public Works \$72,500 at the beginning of the year to clean the streets. Of this amount, \$24,127.80 has been expended on the equipment of the plant and \$4,229.42 was paid out of last year's fund, making the total cost of the plant \$28,357.22. This includes the cost of mules, horses, dump wagons, sweepers, harness, blacksmith outfit and other sundries. This is considered in the light of a permanent investment and is counted as one of the city's assets.

As the city now owns its cleaning equipment, those in charge of the work believe that they can clean the streets next year with an initial appropriation of \$55,000. Making allowance for the increased area that is being taken care of, it is estimated that this will mean an actual saving of from \$20,000 to \$25,000, as compared with the contract cost in 1904. As the department gains more experience, Superintendent Garrard believes there will be an appreciable lessening of expense.

The cost of sweeping to the city is figured at 12.5 cents for 10,000 square feet. The contractor was paid 13.9 cents last year, and in 1903 it was several cents more than that. Money is also saved by the city in the item of day men and teams. The item of feed amounts to about \$17 a day for the stock. In the winter time these same teams are used to haul away the snow from the downtown streets.

Mayor Holtzman is more than pleased with the result so far. The cleanly condition of the streets is the subject of remark on the part of all visitors. Complaints do not average one a day on the sweeping now. When the work was done under contract they were far more numerous.

The Effect of Measuring Water*

THE most certain means of detecting waste, and the most effectual means of preventing the extravagant use and waste of water, is that of measuring the water supplied to each municipality, district or individual water taker, and obliging each municipality and individual to pay for water in proportion to the quantity used. Where meters are in

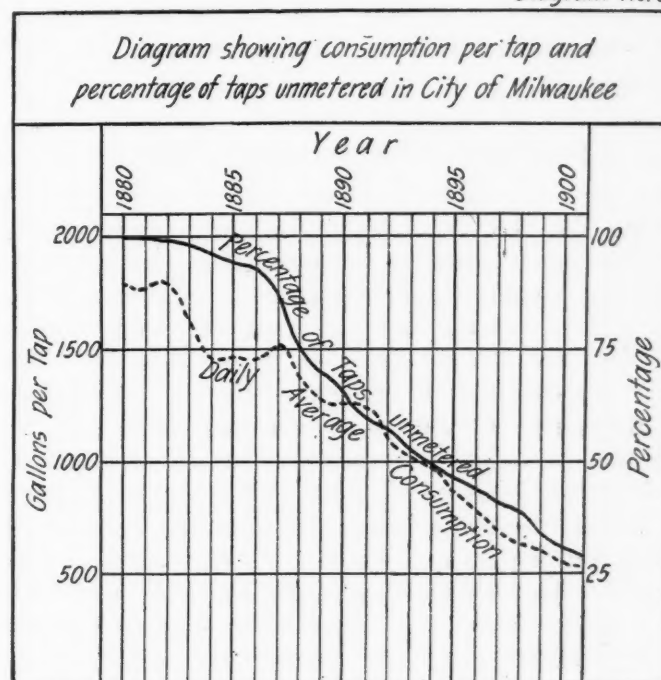
CITY ON TOWN.	Number of Consum- ers.	Per Cent. of Services metered.	Consump- tion (Gallons per Day per Con- sumer).	CITY ON TOWN.	Number of Consum- ers.	Per Cent. of Services metered.	Consump- tion (Gallons per Day per Con- sumer).
Milwaukee, Wis.,	208,000	80.0	81.0	Buffalo, N. Y.,	380,000	2.0	324.0
Providence, R. I.,	198,400	84.5	88.0	Indianapolis, Ind.,	169,100	6.0	79.0
Worcester, . . .	119,330	94.5	68.0	New Haven, Ct.,	108,000	2.6	150.0
Fall River, . . .	107,650	95.0	41.0	New Bedford, . .	61,000	18.0	104.0
Lowell, . . .	100,000	65.0	57.0	Cambridge, . . .	94,150	15.0	85.0
Lawrence, . . .	65,000	83.0	53.0	Haverhill, . . .	37,200	10.0	95.0
Brockton, . . .	37,800	90.0	36.0	Lynn, . . .	74,000	25.0	63.0
Newton, . . .	35,400	86.0	54.0	Waltham, . . .	24,550	6.0	99.0
Woonsocket, R. I.,	34,474	96.0	29.0	Salem, . . .	36,250	3.0	79.0
Ware, . . .	7,690	100.0	44.0	Montague, . . .	6,150	2.0	73.0
Wellesley, . . .	5,147	100.0	49.0	Dedham, . . .	7,500	2.0	83.0
Reading, . . .	4,395	100.0	33.0	Braintree, . . .	5,980	1.0	91.0
	1,023,276	-	61.7		933,880	-	178.5

use, each water taker finds it to be for his interest to see that they are kept in repair; that the pipes in his buildings are so located that they will not freeze during cold weather; and that his family or employees are not wasteful in the use of water. The introduction of meters upon all old works has always been followed by a reduction in the quantity of water used; and in cities and towns where they

* Excerpt from a report on the measurement, consumption and waste of water supplied to the Metropolitan Water District, Boston, Mass.

have been introduced when the works were built, the per capita consumption is universally very low. The effect of the use of meters is well illustrated by a comparison between

Diagram No. 8



the per capita consumption of water in cities and towns where meters are in general use with that in those where water is paid for at schedule rates. Differences in climate, in character of business and in location, as affecting the available supply of water, often have a marked effect upon the consumption in different cities; but in the following table an attempt has been made to eliminate these differences, as far as possible.

In the first four columns are given the statistics for twelve cities and towns where meters are in general use, and in the following columns corresponding data for an equal number of cities and towns of approximately equal size where few meters are used, but where the conditions regarding location and trade are generally similar. The average per capita consumption where meters are used is but little more than one-third of that in the unmetered cities.

The effect of the use of meters upon the consumption of water is very graphically illustrated by Diagram No. 8, which shows the daily number of gallons used per tap in the city of Milwaukee, and the percentage of unmetered taps for each of the past twenty-two years.

It will be noticed that there has been a gradual reduction in the quantity of water used with the increase in the use of meters. In 1880, with no meters in use, 1,750 gallons were drawn from each tap; in 1890, with about one-third of the taps metered, the quantity drawn from each was only 1,250 gallons; and in 1902, with 72 per cent. metered, the quantity used per tap was only 550 gallons.

During the past two years the Water Department in the city of Cleveland has been engaged in placing meters upon service pipes. At the end of the year 1902, 11,099 meters were in use on 56,816 services; and the daily average consumption for the year was 69,964,740 gallons. At the close

of the year 1903 the number of meters had been increased to 25,193; and the daily average consumption for the year was 62,012,000 gallons. As a result of this work, the daily average consumption for the year 1903 was about 8,000,000 gallons per day less than in 1902, and the greater part of this reduction was no doubt due to the meter set during the previous year.

Salt Water Fire Protection System

IN the budget of the Supervisor for the fiscal year July 1, 1905-1906, the sum of \$150,000 has been appropriated as a partial payment toward the construction of a salt water protectice system, in San Francisco. A similar sum was appropriated one year ago, but it was not used owing to the fact that it was necessary to condemn the property necessary for the reservoir site on Twin Peaks. Condemnation proceedings are now proceeding, and the city will come into possession of the land in the near future. The site selected is on the highest hills in the neighborhood of the city, to which it is proposed to pump salt water from the ocean, a distance of about three miles, the height of the reservoir insuring the necessary pressure to cover the whole city. Such a system, or some other method of increased fire protection, is a necessity in this city, the mains in the old business quarter being only from 6 to 8 inches in diameter as compared with mains of 30 inches in diameter in other large cities. A considerable number of buildings in the business section are frame structures; and if a fire were to secure a good staart, it would be almost impossible to save the city. However, San Francisco has a fire department not excelled in any city in the United States and equalled in but few. The losses from fire are comparatively small, and the rate of insurance low, owing to the extreme efficiency of the fire department. This fact is particularly noteworthy considering that San Francisco is practically isolated from other cities, and in case of a large conflagration could not secure assistance from neighboring cities in the way of engines, etc.

At the last session of the Legislature of this State a bill was introduced to provide a fire boat for the protection of San Francisco, but the measure failed to pass. It was intended if such a fire boat were secured, to lay mains along Market street to Fifth street, with some lateral branches, so that in case of fire the water could be pumped up through the main with a sufficient pressure to reach the highest buildings in the neighborhood.

New Orleans Water Works Construction.

IN the 10th semi-annual report of the Sewerage and Water Board, General Superintendent Earl gives the following account of water-works construction in the city of New Orleans during the year 1904 in connection with the great improvements planned for the city involving the expenditure of many millions:

"In connection with sewer Contract "O" about three miles of water mains were constructed during 1904 in Magazine street from Napoleon avenue to Audubon Park, and in several streets connecting Magazine street with Chestnut street. This pipe consisted of 4-inch, 6-inch, 12-inch and

16-inch pipe, and a careful force account kept during construction and checked up against the actual cost of executing the work, as stated by the contractor, shows that the prices used in estimating the cost of such work would have allowed very little profit in this case. This, because there was not enough of the work to permit of the advantage to be gained by organization on a larger amount of work, and also because of the more than average difficulty of the conditions due to the narrow and awkward space in which much of this particular pipe had to be laid.

"The contractor's bid, however, as claimed by this department at the time of letting, was an unbalanced bid and was very much too high on all items of water pipe laying, giving on such items an unreasonably large percentage of profit. This information will be of value to the Board in judging of the fairness of future bids on water-works construction.

"During 1905 it is intended to start the construction of some of the main pipe lines of the water-works system, connecting the water-works pumping station with the river and with various parts of the city.

"It is also expected during 1905 to place the pumping machinery contract. Specifications for both the pumping machinery and pipe contracts, just mentioned, were prepared during 1904, and bids on the former were received in November and on the latter were advertised for January 31st, 1905, but the technicality raised by the attorney of the Holly Manufacturing Company, viz., that formal approval of these specifications had not been made by the Sewerage and Water Board, not only caused the rejection of most favorable bids from desirable bidders for pumping machinery, but also for two drainage contracts, aggregating about \$200,000, all of which it was desired to push forward as rapidly as possible. Other water and sewerage contracts, nine in all, were advertised for January 31st, 1905, and opinions by Special Counsel resulted in the withdrawal of these advertisements as well, pending formal action by the Sewerage and Water Board approving the specifications governing them prior to the advertising for bids. So that bids for all construction work to be executed in 1905 will be received probably in April instead of in January or February as heretofore.

"It has been expected that bids for the Water Purification Station work and Water Work Pumping Station buildings would also be advertised during 1905, but the delay of three months above noted may prevent the necessary preparation that will permit such advertisement before the early part of 1906."

Town Individuality*

HAS it ever occurred to you as you wend your journey through unfamiliar ways what a difference there is in towns and the first impressions they make?

When you see—across the river—a white-cottage village pillowing its drowsy self upon the turf of the foothills, its one lone spire, like an index-finger, indicating in which direction its flock is bound, you know by intuition that you would find there that inquisitive and yet congenial welcome

* From "Vest Pocket Confidences," in "Four-Track News" for July.

which is accorded to strangers who are so scarce as to be curiosities.

Some towns, like some men, are too much absorbed in their own affairs to be hospitable, and the casual traveler, in passing, can generally detect them. They are too busy to be socially civil—they have no time to exchange experiences with men who have seen the world. The town tattle takes up so much of their time that they haven't a moment for serious discussion; and the queer part of it is that there seems to be a something about the very atmosphere of such a town that warns the stranger and urges him to pass on.

There is the town whose lawns are fringed with flowers, whose streets are generously wide, whose parks have no "keep-off" sign, whose homes are surrounded with rocking-chair verandas, and whose whole air is one of fellowship. You can breathe the inspiration of such a town as you pass it by—if you possess the requisite self-restraint to pass it.

How is it that one town is cordial, generous, hospitable and friendly and the next town, in the same county, settled by the same parent stock, is cold, selfish and distant?

There is no denying that it is so, but it would be difficult to explain why.

The army of "summer sojourners" now bent upon a few weeks in the country, should be careful in the selection of a good, hospitable place to anchor.

Wilful Water Waste

CITY ENGINEER SILAS S. FOSTER, in his annual report for 1904, the Board of Public Works of Little Falls, N. Y., has this to say about the wilful waste of water in connection with the water-works department of that city.

"We have still to contend with the wilful waste of water. This occurs during two seasons of the year, the dry time in summer and the extreme cold in winter. The causes are inferior plumbing, carelessness, sprinkling lawns, etc., in summer; the allowing of faucets to run to keep from freezing in winter. This last is found in unoccupied dwellings, in stables and the cheaper class of stores and tenement houses, and in winter, though we have a full conduit flowing into the reservoir, there is a steady lowering of water.

"In one district in Philadelphia 63 per cent. of the total water consumed was wasted by 17 per cent. of consumers in that district, and in another 86 per cent. consumed was wasted by 7 per cent. of consumers. This fact that a comparatively small portion of consumers do most of the wasting was partly proven in our last inspection, when the stopping of a few bad leaks showed a steady increase in the reservoir, where before there was a steady decrease. Still, though an inspector may force the fixing of leaky faucets, he cannot stop the wilful waste of water. A fair average of allowance of water per capita should be from fifty to 100 gallons per day, and thirty-three English cities where meters are generally used show an average of only thirty-three gallons per capita. A leaky faucet will waste from seventy-five to 300 gallons per day, and a leaky ball cock in tank will waste 1,000 gallons in twenty-four hours, which is as much as twenty people could use for domestic purposes, the proportion for domestic uses alone being from thirty to fifty gallons per capita per day. An individual says: 'That's only one faucet leaking or running, I won't bother about it; this

one will not make any difference.' He does not realize there may be others who are doing the same, and that a few such cases make a vast difference.

"Worse than the leaky faucets are the ones that are left open through carelessness or to keep them from freezing. One three-eighths-inch stream with forty-eight pounds pressure will waste 27,000 gallons in twenty-four hours. The pressure in this city would average from ninety to 100 pounds, and the waste from a three-eighths-inch stream would be about 44,000 gallons per day, so that it can be easily seen that the waste from a small number of such streams would supply the whole city with water for domestic purposes. The only permanent relief seems to be in the installation of meters, and I would recommend that at least those who are known to be flagrant wasters of water be forced to put them in.

"Fall River and Worcester, metered cities, show an average of only 12.3 and 16.8 gallons per capita for domestic use.

"Cities under 25,000 inhabitants with 50 per cent. of taps metered show an average of fifty gallons per capita, with seventy-five gallons maximum. Many would probably oppose the placing of meters, but when they realize that if your Board were obliged to go to great expense to increase the source of water supply, that 75 per cent. of owners would be paying for a tax caused by the waste of 25 per cent. of owners, they would have very little reason to object. There is no limit to the waste of water, and may be from 300 to 1,000 gallons per capita per day. It will increase every year unless measures are taken to permanently stop it."

Cheap Fuel Gas Franchise

SPECIFICATIONS have been adopted by the Board of Public Works of the city of Indianapolis for a cheap fuel gas franchise, which is to be awarded to the best bidder on August 23. The chief point of competition will be the rates at which the gas, whether it be manufactured gas or a mixture of manufactured gas and natural gas, will be furnished. In dealing with the bids submitted, the Board will take into consideration the kind of service proposed to be given and the quality of the gas offered.

The gas must have a calorific value of 575 B.T.U. for heating purposes and fourteen candle power so that it can be used for incandescent lighting. Bidders must include with their bid a plan of the plant to be erected, so that it can be made a part of the contract to be entered into. The object of the city is not only to get the lowest rate possible, but also first class and efficient service.

Bids must be accompanied by a cash deposit of \$25,000 that the bidder, if successful, will enter into a contract. When the contract is approved by the city council, \$25,000 more in cash will have to be deposited with the city that the terms will be complied with, and this money will be paid back in installments as the obligations are satisfied. Other surety bonds are also provided for.

Under the original natural gas ordinance of Indianapolis, the city maintains that it has a right to buy the plant of the Consumers' Gas Company at an appraised valuation, which the Federal Court has ordered to be sold, as the natural gas business is at an end. Upon this position, the specifications for a fuel gas franchise offer the successful bidder

the city's right in the mains and pipe line of the Consumer's Company. It is believed that this inducement to get a complete system of mains and house connections already in place at an appraised valuation will prove attractive to bidders.

The new company must begin within sixty days after getting the franchise, and must be ready to do business one year later, having 100 miles of mains. A forfeit of \$50 a day will be required for delays. The gas field in Indianapolis is now controlled by the Indianapolis Gas Company, headed by F. S. Hastings, of New York. This company has no fuel franchise, though it has been selling its lighting gas at 90 cents a thousand for heating and cooking purposes. For some time it has been trying to get the pipe line of the Consumers' Company in order to retain its monopoly.

Municipal Street Railroad in San Francisco

IN the budget of the Supervisor for the fiscal year 1905-1906 the sum of \$350,000 has been appropriated as the first half of the amount required for the construction of the Geary street cable system from a cable road into an underground electric system. Nearly the entire street railways in San Francisco are owned and controlled by the United Railroads, and the officials of that corporation maintain that the estimated cost of the reconstruction of the Geary street railroad by the city experts is about one-half of the amount required for the purpose. Influenced by this statement, the Merchants' Association of San Francisco has employed William Barclay Parsons, the renowned engineer who built the subway roads in New York, to come to San Francisco for the purpose of making an extensive report for a complete railway system to meet the present and future wants of San Francisco. He is expected to arrive here in the latter part of August; and in the meantime, the Merchants' Association has requested that the Supervisors take no further steps toward the work of reconstructing the Geary street road for municipal ownership. It is the intention to secure the reconstruction of this road to conform with plans which may be adopted, one of which may be the construction of a subway under Market street and up such side streets as Sutter and Geary streets, coming to the surface beyond the business district. Consequently, if the city should reconstruct the Geary street road without reference to such future plans a great amount of money would be uselessly expended.

Purifying Drinking Water by Electricity*

THE Frankfort "News" states that it is probable that electric purification of drinking water will soon be introduced into the home. This method, already used by a number of municipal waterworks, is based upon the germ-killing effects of ozone, which is cheaply engendered by electricity. If an electric discharge takes place between two glass tubes, one inside the other, whose surfaces facing each other are coated with metal, ozone is developed in the space between the tubes.

* From United States Consul General Guenther, Frankfort, Germany.

Electricians have tried in recent years to simplify the means of electric ozone development for purifying water. The ideal apparatus would be one which every housekeeper could put up in the kitchen, and by utilizing the electric current of the common electric-light wires purify every glass of drinking water. According to the Frankfurter Umschau, such an apparatus seems to have been successfully made by a French engineer, Mr. Otto.

This apparatus is of very simple construction and takes up little space. It consists principally of a small, closed box, the metal cover of which is made conductory with the bottom. In the box is an ozone developer, an interrupter, and a tin tube. Through the latter the ozone, which first has to pass through a cotton stopper to free it from dust and germs contained in the air, is conducted into the water and mixed therewith. If much ozone has been absorbed, the water becomes phosphorescent in the dark. The most important part of the apparatus is the "mixer," action of which can be interrupted at will. The apparatus is capable of purifying about 60 gallons of water an hour, and the cost per hour is about the same as that of an ordinary electric incandescent light.

Municipal Consumption Sanitarium

THE Board of Estimate of New York City has appropriated \$250,000 for a tuberculosis sanitarium. It will be located at Mount Hope, Orange County, and will be 1,200 acres in extent, including forty farms. The site is 1,000 feet above tide water in the Catskills, is on the top of Shawangunk Mountains and is back of West Point, twenty-five miles from the Hudson River.

The consent of the authorities of Orange County has been obtained for the project, and the land will be purchased by the city immediately, as an option has been secured.

The funds appropriated will be used to purchase the site and to improve the houses that are already on it. An administration building will be added next, and that will be followed by a large hospital, intended to be the finest in the world and to handle 400 cases at a time. The sanitarium will have its own water and light plant and will be independent in the matter of other necessary plants. Patients will be educated as well as cured so that they may perform missionary work and assist in checking the spread of the disease. Health Commissioner Darlington asserts that there are in New York City alone 25,000 consumptives, and he plans to have them cared for by the city free of charge.

There will be such sanitary precautions taken to eliminate the danger of contagion to the residents of the county. No incurable cases will be handled, but only cases in the first stages of the malady.

The total cost of the buildings, etc., has not been estimated, as the Board of Estimate acted on the recommendations of the Health Department, endorsed by the leading physicians of the city. The matter was urged as an immediate necessity, and immediate steps were taken for its inception.

The project is not entirely a new one as the city of Rochester, N. Y., has had a sanitarium in operation for the last two years and the results have been satisfactory.

The Multiple-Unit Plan*

PONDERING over the elevated-railway-train problem one day, the thought suddenly flashed upon me, Why not apply the same principle to train operation? That is, make a train unit by the combination of a number of individual cars, each complete in all respects, and provide for operating them all simultaneously from any master switch on any car. This idea, sketched on a scrap of paper, marked the complete birth of this new method, then named and now nearly everywhere known as the "multiple-unit system." Its great possibilities instantly absorbed my interest, as I saw the opening of a new epoch in electric-railway operation. Here was a way to give a train of any length all the characteristics of a single car, with every facility of operation which could be demanded by the most exacting conditions of service and capacity.

After two abortive attempts to get the privilege to demonstrate the advantages of the system at my own expense on the Manhattan road in New York, an unexpected opportunity suddenly arose in the spring of 1897, when I was requested to act as the consulting engineer of the South Side Elevated Railway of Chicago. A brief inspection of the layout showed a field ripe for multiple-unit application, which I briefly explained to Sargent and Lundy, the engineers, and to Mr. Clark, of the General Electric Company, fortunately all old friends. I hastily drew up a report, the main feature of which was an argument in favor of the abandoning of locomotive cars, and the adoption of individual equipment under common control—in short, the multiple-unit system. As an earnest of my confidence, I supplemented the report by an offer to undertake the equipment of the general plan outlined, which met with the indorsement of the engineers. This was followed by a visit to Chicago; but the contract was not concluded until after I left for Europe, and then only after a very bitter fight with various companies, and under most onerous conditions, supplemented by a \$100,000 bond for performance.

Among other things, I was immediately to begin work on the entire equipment, and to have six cars ready for operation in two months, on a standard track supplied by me, the manner of making the test to be prescribed by the officers and engineers of the road, and to be to their satisfaction. Should the test be not concluded by the date set, or be unsatisfactory, the contract could be cancelled. Satisfactory further tests could be called for elsewhere, and the remaining equipments were to be completed by specified dates. As soon as the power-house and road were ready there was to be another test of not less than twenty equipments under service conditions for a period of not less than ten days. Should these equipments prove satisfactory, the right remained to cancel the contract and to require waiver of all claims against the company.

I did not return to New York until about the middle of June, so that most of my instructions for the trial equipments were by cable, and the actual preparation was made within thirty days, despite a wholesale strike of the machinists employed in the shops of the new Sprague Electric Company, which soon took over the contract.

On July 16, 1897, two cars were put into operation on the tracks of the General Electric Company at Schenectady,

and on the 26th, the half-century anniversary of Prof. Farmer's test of a model electric railway at Dover, N. H., my ten-year-old son operated a six-car train in the presence of the officers and engineers of the South Side Elevated Road at Schenectady.

In November a test train of five cars was put in operation in Chicago, and on the 20th of April following twenty cars, seventeen of which (one in flames) were taken off during the day because of defective rheostats; but with the last three-car train I had the satisfaction of pushing a steam train around a curve. Three months later, a year after the Schenectady test, locomotives had been entirely abandoned, and the whole 120 cars were in operation, the local work being largely supervised by my assistant, Frank H. Shepard.

The system, with sundry changes in detail, has now been universally adopted for electric train operation on underground, elevated and suburban roads, and the largest present enterprise in substitution of steam operation, the electrification of the New York Central Terminals and a portion of its main line, is likewise dependent upon it. There not only the suburban cars, but the great locomotive supplied by the General Electric Company, of 2,200 horsepower capacity, and weighing 100 tons, are to be controlled of the multiple-unit plan, so that two or even three locomotives, representing an aggregate of several thousand horse-power, under simultaneous control, can be put at the head of any train which may be made up.

Lighting Ultimatum in Saginaw, Mich.

THE City of Saginaw has determined to get arc lights at \$60 each or to construct a municipal electric lighting plant. The committee appointed to inquire into the matter reported that in view of the reduced cost in supplying electricity, the local company should agree to furnish lighting at the above price, and recommended that a five-year contract be closed with it on that basis. In the event of the company refusing to consider such a price the committee recommended that immediate steps be taken for the construction of a municipal plant. The report of the committee, in part, is as follows: "The contract shall be prepared by the City Attorney and approved by him as to form and execution.

"Unless this contract is executed by the Bartlett Illuminating Company within 10 days from the adoption of this report, the common council shall immediately take proceedings to authorize a special election to be held within the shortest time possible for the purpose of submitting to the taxpaying electors of the city the question of issuing bonds for the purpose of raising money to be used in building a municipal electric lighting plant, and issuing of bonds for the erection of such a plant; the same shall be built as speedily as possible.

"In the event that the Bartlett Illuminating Company enters into a contract with the city for the lighting of its streets upon the terms and conditions hereinbefore set forth, there shall be submitted to the taxpaying electors of the city on the 24th day of April next, the question of issuing bonds for the erection and maintenance of a municipal lighting plant." The report was adopted by a vote of seventeen to three.

* From Frank J. Sprague's "The Electric Railway," in the August Century.

City May Buy Its Own Brick

CHIEF ENGINEER MORRIS R. SHERRERD of Newark, N. J., is planning to have the city buy its own paving brick in the future. Mr. Sherrerd intends to have inspectors in the kilns to insure good quality in the bricks purchased. This plan is expected not only to give better brick but also to get them cheaper and to reduce the cost of paving from \$2.03 or \$2.15, as now charged, to \$1.75. This plan was initiated by a suit against the city by the Barber Asphalt Paving Company, the city refusing to pay the final \$8,000 on a paving contract, contending that the brick was of poor quality. The city lost the case, the paving company contending that it had complied with the specifications and being upheld by the Court. Mr. Sherrerd is now at work on new specifications to govern all such work in the future, and these, with the brick purchased by the city, will ensure satisfactory pavements. Mr. Sherrerd said:

"I expect shortly to advocate a plan whereby the city may buy the bricks it needs on its own responsibility. Money will be saved in this way, for an inspector will be at the kilns and make exhaustive tests from each lot of bricks turned out. Those lots that pass will be stored to one side, to be used by the city, and shipped when needed. In this way freight charges will be saved, for now we often reject a lot of bricks after they are piled along the street, and they have to be sent back. It is not likely that the contractor is going to stand this loss, and so he probably makes his prices higher when he bids to provide for this contingency.

"Another effect will be that contractors will be better able to bid, for they will have no responsibility for the quality of the bricks, the city assuming that, after its own engineers have made the tests.

"If my plan goes through, in the laying of future brick pavements all the contractor will be asked to do will be to excavate, lay the foundation and curbs, and set the brick the city provides. The contractor will not have to depend on the guarantee of the brick maker, as he does now. The city will first judge and then buy its own brick at the kilns, and in sufficiently large quantities to get a low price.

"I believe in this way we can save at least 15 per cent. of the present prices of brick pavement, in addition to getting better work. We may get the pavements for \$1.75 per square yard. Time saved will be another object, for the city will have on hand in advance a quantity of brick, and can ship them whenever and wherever needed at short notice."

Unique Saloon Scheme*

A SYNDICATE of Los Angeles capitalists, who represent a large sum of money has made a unique proposition to the Board of Police Commissioners of that city. It proposes that 200 saloon licenses at present issued in Los Angeles be revoked, and that in their place be issued seventy-five licenses to the syndicate, or a reduction of 65½ per cent.

In return for this exclusive privilege the syndicate agrees to pay the city \$190,000 annually, or at the rate of \$200 a month per saloon. In addition to this it agrees that a forfeit

shall be paid to the city in case any liquor shall be sold to an intoxicated person, and that a liberal but unnamed amount shall be paid for public improvements. It also will dispense coffee and other non-alcoholic drinks.

Something may be said on both sides of such a proposition as this. In the first place it creates a monopoly and shuts 200 private individuals out from the business they follow, while an increase of monopolies and a hindrance to private enterprises is not a need of the present time when the tendency even without official help is too much in that direction.

This is one side of the argument, but there is a good deal to be said on the other. Undoubtedly such a syndicate would faithfully keep its agreement not to sell liquor to intoxicated men, and that would be a decided improvement on the system under which any individual can get as drunk as he pleases at any time he chooses. There is not much room for question that under such an arrangement the days of the vile groggery would be ended in Los Angeles.

NEW YORK TO TREBLE ITS WATER SUPPLY.—The Burr-Hering plans for Esopus and Rondout watersheds for New York's additional water supply will be completed by early September, and it is expected that the ground will be broken by January. The report covered all available ground for water purposes and fixed upon the Ulster County watershed as the best. The plans will be submitted to the State Water Commission in September, and as the members of the Commission have kept in touch with the work, there will be no delay in securing their approval. The contracts will be divided into four sections and each section will be under an engineer, thus allowing the work to progress rapidly. The State Civil Service Commission has exempted the six consulting engineers from the examinations, and this will also promote speed in the work. The old Croton dam holds 3,400,000,000 gallons and the new Croton dam held this spring 3,500,000,000 gallons of water, or a total for the two dams of 6,900,000,000 gallons for this summer. The recent hot spell emptied the new Croton dam and left the city to depend on the old dam. The daily consumption of water in Manhattan and the Bronx is about 285,000,000 gallons, and under normal conditions the old dam would supply the city for several months, as there is a constant inflow. The new Croton dam was not completely filled this year, and is being cleaned. Next year, when it and the old dam are filled, New York will have a water supply of about 20,000,000,000 gallons.

TRAMWAY SYSTEM IN BELFAST.—Large extensions are being made at the corporation generating station in Belfast for the electrification of the tramway system. A plant for 3,000 kilowatts is being installed and about 40 miles of streets are in process of being equipped. The present capacity of the electrical works is 3,400 kilowatts. The connections to the mains are equivalent to 197,000 8-candle-power lamps, including 2,100 horse-power in motors. The supply is by the three-wire low-tension system, with 220 and 440 volts supply pressure. All the generators are arranged so that they can work as shunt machines on the lighting supply or as compound machines on the traction supply.

* From "Pacific Municipalities."

Fire and Police Personals

—James Davis, fire commissioner of Providence, R. I., died recently.

—Abraham Green has been made chief fire marshal of Shenandoah, Pa.

—Fire Chief Frank Schlatter, of Port Huron, Mich., has been re-elected.

—William Dowty succeeds the late Adam Becker as fire chief of Hamilton, O.

—Mr. Patrick Delaney has been appointed fire marshal of Leavenworth, Kan.

—James Kelly has been elected chief of the fire department of Winsted, Conn.

—William Trepagnier has been chief of the fire department of Plaquemine, La.

—G. A. Willis has been elected chief of the fire department of West Grove, N. J.

—E. Bergeman has been appointed chief of the fire department of Wittenberg, Wis.

—Thomas B. Pepper has been elected chief of the fire department of Georgetown, Del.

—Chief Hastings of the fire department of Rock Island, Ill., has tendered his resignation.

—Speers B. Cummings has been elected chief of the fire department of Hackensack, N. J.

—William Ruff is the new chief of the reorganized volunteer fire department of Troy, Ill.

—Egbert L. Cluse was elected fire chief of the Great Neck fire department over W. K. Vanderbilt, Jr.

—Fire Chief Patrick Mealey of Gloucester, N. J., has been re-elected. He has held this position since 1878.

—Adam Becker, chief of the fire department of Hamilton, O., died of heart failure on the streets of that city.

—A. B. Cairnes, for sixteen years the chief of the fire department of San Diego, Cal., has been re-elected for two years more.

—James Clancy has been appointed to succeed the late Herman Meminger as chief of the fire department of Milwaukee, Wis.

—The appointment of Norman B. Holmes, of Chicago, as fire marshal of Evanston, Ill., has been confirmed by the council of that city.

—Mr. Oren C. Steele, late city clerk of Batavia, N. Y., has been elected chief of the fire department of that city. He has been a volunteer fireman for fifteen years.

—William Earley has been appointed chief of the fire department of St. Catharines, Ont. He was a driver of the hose wagon of the central fire station for twenty-seven years.

—District Chief Avery has been appointed life-saving and ladder drill instructor of the fire department of Worcester, Mass., and will take a month's training with the New York department.

—William F. Wilkins, chief assistant fire marshal of Philadelphia, Pa., has been removed by Sheldon Potter, director of the department of public safety, on the charge of conduct unbecoming an officer and disobedience of orders.

—Herman Meminger, chief of the fire department of Milwaukee, Wis., died from inhaling nitric acid fumes.

He is the second chief in Milwaukee to succumb to nitric acid fumes, his predecessor, James Foley, dying from the same cause.

—Mr. Frank P. Foster has resigned his position as superintendent of the fire alarm system of Corning, N. Y., to become electrician at the Corning Glass Works. Mr. Foster is secretary of the International Association of Municipal Electricians.

—Mr. Frank J. J. Connery, of New Castle, Pa., is entering upon his third term as chief of the fire department. He is forty-nine years of age and has been in the service for twenty-nine years, having entered in 1876 at the age of twenty. He has passed successively through all the positions of the service.

Water-Works Improvements of St. Louis

BEN. C. ADKINS, Water Commissioner of St. Louis, Mo., and the new president of the American Water-Works Association, reports that the cost of operating, maintaining, extending and reconstructing water-works for the fiscal year ending April, 1905, was \$1,373,861.34, of which \$313,186 was spent for extending the distribution system. The cost of purifying the water was \$119,126.18, or \$3.59 per million gallons. The amount of water pumped at the Chain of Rocks pumping station was 33,133,190,950 gallons, an increase of 3,570,739,775 gallons over the pumpage of the preceding year. The average daily consumption was 79,000,000 gallons, an increase of 9,000,000 gallons over the year before. The maximum, 109,185,000 gallons, as against 88,334,000 gallons for the year previous, was due to a great degree to the World's Fair. The sediment removed from the settling basins totaled 229,093 cubic yards, and cost \$2,502.75, or 1.9 cents per cubic yard. The distribution system was extended eighteen miles, making the total length 947.9 miles. Permanent brick boxes for stop valves and fire hydrants were added, to the number of 1,100. There are now in the system 8,524 fire hydrants. Of the total number of taps, 77,951, there were added 3,535. Metering all but residence connections was begun, and a large number were set on hydraulic elevator services. The special waste investigation showed 1,626 cases of wilful waste in the three winter months. The testing laboratory made tests of cement for the use of the water, street and sewer departments, representing 19,951 barrels and 362,922 sacks.

DISINFECTING SCHOOL BOOKS IN BUFFALO.—Health Commissioner Walter D. Green, of Buffalo, N. Y., has started a crusade against the germs that infest school books. At the close of the schools every year the Health Department visits each school in turn and collects all the books in the building. These are taken to one or two rooms, depending on the number of books to be disinfected, and are stood on end. Each book is by itself and has its leaves and cover opened so that the fumes will go through it thoroughly. A simple tin arrangement which costs but a few cents is then heated and formaldehyde gas generated. The formaldehyde is used in a 42-per cent. solution. There are about 55,000 books disinfected each year, and the cost is but a trifle, being about six cents per room.

INCIDENTAL ITEMS OF INTEREST

Many Matters of Moment to Municipalities Briefly Told—Short Record of Happenings and Facts in City, Town and Village

UGLY POLES REMOVED.—The Park Commissioners of Harrisburg, Pa., are taking action against the unsightly electric light and other poles that are in the river front parks. Recently twenty of the ugly poles that fringed one park were cut down, the wires having been removed by the company owning them. This is only a beginning, however, and all poles of the same sort will fall. In the places of these will be erected ornamental iron poles with arms. New gas light poles will also be erected, and are of the same material. These will be placed along the banks and close to the walks. The electric light company is assisting in the work, and before long the substitution will be completed.

INSPECTION OF MILK SUPPLY.—After vainly endeavoring to have the state legislature restrict the entrance of infected milk into the city, Dr. Walter D. Green, Commissioner of Health of Buffalo, N. Y., has succeeded in his efforts for a pure milk supply. After a hard fight he persuaded the city council to take action on the matter, and now Buffalo receives a healthful milk supply. Three country milk inspectors are now employees of the health department, and they are permanently located in the surrounding country. Each farm or dairy is inspected, and all cows are examined. The cleanliness of the building and of everything likely to come in contact with the milk is inspected. Any sickness in the family is noted and incorporated in the report. Milk that comes from a farm or dairy that is not up to the standard required, is rejected and refused admittance to the city. Dr. Green traced several cases of sickness to milk, and that was the beginning of his labors for its purity. Later, Ithaca and New York City took up the fight against germ-infested milk, but much of the credit for the idea must go to Dr. Green.

CONSUMPTION OF WATER IN MONTREAL.—The consumption of water in Montreal during the recent hot spell averaged 30,618,750 gallons per day. The maximum daily consumption was 33,100,000 gallons and the minimum 28,150,000 gallons. The increase in the consumption of water during the last four years has been nearly 30 per cent., necessitating the installation of a 12,000,000-gallon pump. While the consumption has been increasing the amount of water pumped by hydraulic power has been diminishing, thus throwing more work on the steam pumping plant. In 1900, the amount of water supplied by hydraulic power was about one-half, and this has been reduced to about one-third, indicating that the hydraulic plant has reached its limit. In 1900, the daily average pumpage was 20,411,859 gallons; for 1901, 21,846,733 gallons; for 1902, 22,377,355 gallons; for 1903, 24,576,363 gallons, and for 1904, 27,715,948 gallons. The pumpage of one year has increased by 3,000,000 gallons a day. At that rate the new pump will be inadequate in four years time. The total number of gallons pumped for 1904 was 10,144,038,107.

MUNICIPAL REPAIR DEPARTMENT.—Philip Hansling, Jr., superintendent of streets of Hartford, Conn., has been laboring for the last five years to put in operation a yard for the repair of the equipment of the street department. These repairs had formerly been made by contractors, and the new yard will save the city money. There has been no cost to the city for its construction, as the work was performed in odd hours by the regular employees of the department. That it took Mr. Hansling five years shows his tenacity to an idea once formed, and also that the regular work of the department has not suffered in consequence. There is a blacksmith shop connected with the yard, which would in itself have paid for the whole plant if the plant had not paid for itself as it was being constructed. The new plant can repair anything used by the department, from putting in a new broom handle to making parts for a ten-ton road roller, and all the work is done when there is nothing else to do and without adding an extra cent to the payroll.

THE REPORT OF THE WATER BOARD OF LOWELL, MASS., for the year ending December 31, 1904, gives a total consumption of 2,007,628,279 gallons of water, of which 43.62 per cent., or 875,780,355 gallons, passed through meters. The average daily consumption was 5,485,323 gallons, and the per capita consumption, based on a population of 104,400, was 52.5 gallons. Each tap used 486 gallons per day. Figured on the cost of maintenance, the cost per million gallons was \$44.01. The receipts from metered services were \$138,121.52, and from the unmetered services, \$36,153.69; total receipts from consumers, \$174,275.53. There are now 133.67 miles of mains, of which 5,706 feet were added in 1904. Eleven hydrants were added last year, making a total of 1,212 in use. The services added last year were 6,638 feet, giving a total of 84.4 miles in use. Of the 7,513 meters in use 277 were added in 1904, making 63.5 per cent. of the services metered. There are eleven pumping engines in service, as follows: Henry R. Worthington, five, of which one is of 500,000 gallons, two of 3,000,000 gallons, one of 5,000,000 gallons, and one of 10,000,000 gallons capacity per twenty-four hours; Knowles Steam Pump Company, three, each of 3,000,000 gallons capacity per twenty-four hours; Deane Steam Pump Company, two of 3,000,000 gallons capacity per twenty-four hours, and one Henry G. Morris engine of 5,000,000 gallons capacity; total daily pumping capacity, 41,500,000 gallons. Bituminous coal to the extent of 8,386,937 pounds were used, costing \$4.75 per ton, delivered. Wood to the equivalent of 2,400 pounds of coal was used, bringing the total of equivalent coal consumed to 8,389,337 pounds. The pumps worked against an average dynamic head of 163.97 feet and an average static head of 156.3 feet. The supply is from 555 driven wells.

DENVER TO IMPROVE LIGHTING SYSTEM.—In Denver, Colo., a movement is on foot to make it the lightest city in the world, besides the cleanest, as it is reputed to be. One of the reasons for the step is to make it more attractive to tourists; the other is, to improve the service. It is proposed to erect thirty-three steel arches to span Sixteenth street, each arch to have 220 incandescent lights. They will reach from curb to curb and support the trolley wires. These arches will add to the beauty of the street, not only because they are ornamental, but also because they will replace the present straight poles used for lighting and traction purposes. The idea came from the beautiful results attained at the Chicago, Buffalo and St. Louis expositions, and the man who planned the effects will undertake the same results for Denver.

LEAKING GAS MAINS KILL TREES.—Augusta, Ga., is investigating the killing of trees by leaking gas mains and will endeavor to secure redress from the gas company. Commissioner Nisbet Wingfield's report on the matter is, in part, as follows: "It is an acknowledged fact that gas taken up by the roots of a tree in large quantities will almost immediately kill it. On a number of streets where the mains are laid close to the curb, and, consequently, near the trees on sidewalks, the trees have been killed; in some instances one or two on a block, and in some cases entire blocks, as was the case on May avenue. This leakage is not confined to the old mains, but to a large extent applies to the new work, which shows that the recent construction in that line is faulty either in workmanship or material. The May avenue line was a new extension, yet every tree for blocks was killed. Within the past few weeks a number of valuable trees on Reynolds street have been killed. Another loss to the city is the damage to its streets caused by the constant digging in search of leaks. There are instances where excavations have been made every twelve feet for entire blocks to repair pipes which should have been laid correctly in the first instance."

WICHITA, KAN., CONTRACTS FOR ARC LIGHTS.—The old system of lighting having been overloaded, thus giving poor service, the city council of Wichita recently made a contract with a local company for a new five-year improved service. The contract is based on 217 arc lights, to be lighted every night until one o'clock. The price per light is \$68.50, or a total of \$14,453.50. Each additional light that may be ordered will cost \$66.00 per year. The lights will be an improved pattern and will have a candle power of 2,000.

THE WATER-WORKS OF ROCKFORD, ILL., pumped 1,434,178,958 gallons of water in 1904 and consumed 6,209,644 pounds of coal, costing \$9,043.92. The amount of coal consumed per million gallons was 4,329 pounds, making the average cost of coal per million gallons \$6.30. The water is supplied by direct pumping from artesian wells. The coal used was bituminous, and cost \$2.91 per ton. The average pressure pumped against was 60.4, and the average pressure carried during fire alarms was eighty pounds. Cost

of pumping by high and low service, as per pumping station expenses of \$19,525.93, was per million gallons to mains \$13.61. Cost of pumping high and low service as per total maintenance of \$29,360.19 was, per million gallons to mains \$20.47. The average depth of water maintained in the reservoir was 16.9 feet, and the average daily pumpage was 3,918,522 gallons. The population of the city was 31,051 in 1904. Of the 129 fire alarms sent in forty-one were by telegraph and eighty-eight by telephone. The average time for each alarm was 16.43 minutes, and the total time that the fire pressure was maintained was thirty-five hours and twenty minutes.

THE WATER DEPARTMENT OF ERIE, PA., pumped 3,690,782,612 gallons of water last year, an increase of 375,447,094 gallons over the year before. The daily average pumpage was 10,084,105 gallons, which, based on a population of 60,000, gives a per capita pumpage of 168 gallons. Meter measurements show that the amount of water furnished to manufacturers and other large consumers was 799,230,438 gallons, an increase of 36,385,744 gallons over 1903. For domestic consumption the daily per capita pumpage was 131.6 gallons. The daily lift for the high service system was 275.53 feet and for the low service system 235.83 feet. There are 117.75 miles of mains, of which 13,539 feet were laid last year. A new intake will be laid in Lake Erie, and the contract for same has been awarded. Twenty-seven fire hydrants were placed last year, making a total of 725 in use. The increase in receipts for water amounted to \$7,241.97 for the last year, and the total receipts of the department showed an increase of \$8,943.13.

NEW POLICE SIGNALS FOR TORONTO.—Local newspaper reports state that the police signal system will probably be extended and overhauled. The system has been inadequate for several years, and the Chief of Police has taken steps for its improvement. In a letter to the Board of Control, he has asked for a modern, automatic central office equipment that will have twelve circuits. Each circuit will have twelve boxes, thus providing for 144 boxes. The present system has only 801 boxes, and these he desires to have reconstructed. Forty new boxes, without booths, are desired, which will give Toronto a police alarm system of 120 boxes.

NEW REGULATIONS ON STREET RAILWAY.—The street railroad company of Augusta, Ga., will have to keep up the streets on which its tracks are laid, is the opinion of City Attorney C. H. Cohen. That part of the street occupied by the tracks and for three feet on each side will be maintained by the company to conform to the rest of the street. When the franchise was granted in 1890 the company was made to repair those streets used by it. In 1896 this was repealed in consideration of certain schedules and agreements on the part of the company. In 1901 this last ordinance was revoked and the former laws upheld. The company is about to enter into litigation to show that the act of 1896 was unrepealable and that it is still valid.

MUNICIPAL OWNERSHIP PROFITABLE.—The report of Charles W. Powers, Superintendent of the Water Department of Bloomfield, N. J., shows that municipal ownership of water-works is profitable. Since January the Department made fifty-one house connections at an expense of \$1,123.02, and received for the work \$2,053.65, giving a profit of \$930.63. For the six months previous the water rents were \$20,500, which arose to \$22,000 for a corresponding period after the installation of water meters. The first three months of the year the town consumed 81,500,000 gallons of water, which was lower than the amount consumed for the corresponding period in several years. The second three months of the year showed a consumption of only 68,000,000 gallons, lower than the amount of water the town would have had to pay for under contract with the local company, as the minimum amount that could be purchased was 75,000,000 gallons each quarter. This saving represents the price of 7,000,000 gallons of water for three months of the year.

THE YOUNGSTOWN, O., FIRE DEPARTMENT RESPONDED TO 278 FIRE ALARMS LAST YEAR, of which eleven were false. The apparatus of the department is as follows: One first size and one second size steam fire engines, with a steam fire engine held in reserve; four combination chemical and hose wagons, and seven exercising wagons; one seventy-foot aerial truck and one service truck, three two-horse hose wagons and two chief's buggies. There is on hand 10,700 feet of two and one-half inch fire hose. The apparatus is drawn by twenty-seven horses. The manual force of the department is fifty-two officers and men. The fire alarm system has seventy public and private boxes, three of which were installed in 1904. The total loss, insured and uninsured, was \$98,850.12; the total insurance loss was \$96,908.12; the total insurance involved was \$1,552,325.00, and the total value of the property involved was \$2,393,480.00. The department traveled 1,144 miles and 1,112 yards, laid 37,500 feet of hose, raised 3,289 feet of ladders and used ninety-nine chemical tanks. The valuation of the property and equipment of the department is \$150,260.00, and that of the fire alarm system is \$16,000.

THE APPARATUS OF THE FIRE DEPARTMENT OF PORTLAND, ORE., FOR 1904 comprised the following: One fire boat, eleven engines, ten hose wagons, one combination chemical engine and hose wagon, three four-wheeled hose carriages, one four-wheeled hand hose carriage, three two-wheeled hose carts, four two-wheeled hose reels, one first-class hook and ladder truck, one second-class hook and ladder truck, three third-class hook and ladder trucks, one hand truck, four chemical engines and five buggies. The total value of the property in trust is \$359,146.75. The total operating expenses of the department for the year was \$119,260, under call or partially paid system, and with additional salaries for full paid department, \$162,320. Of the 512 alarms for the year 1906 were from boxes, 240 from telephones and seventy-six still. There were thirty-five false alarms for 1904, a decrease of seven from the preceding year. The increase of alarms over 1903 was eighty-two. The total loss last year was \$414,899.89, as against

\$912,753.73 for the previous year. The department consists of 158 officers and men and sixty-four horses. The full paid department has been in operation only for six months of the year. In addition to the regular department there are three volunteer fire companies in suburban districts. In the paid department there is 19,432 feet of two and one-half inch cotton rubber lined, 8,300 feet of two and three-quarter, 2,000 feet of three and one-half, 300 feet of one and one-half and 1,000 feet of chemical hose. In the volunteer companies there is 2,700 feet of rubber hose, making a grand total of 33,032 feet of hose in actual service.

THE FIRE DEPARTMENT OF SAVANNAH, GA., for 1904 consisted of eighty-seven men, divided into eight companies. The apparatus is as follows: Six engines in active and one in reserve service; seven two-horse hose wagons and four one-horse hose reels, the latter being in reserve; one double-tank chemical engine, eighty-five gallons capacity each; one fifty-five foot aerial extension ladder truck, one fifty-two foot extension ladder truck and one light steel frame ladder truck; four combination chemicals, four supply wagons and two buggies. There are 18,603 feet of fire hose of which 11,775 feet is in good condition. The value of the department's property is \$180,797. The 286 alarms, an increase of twenty-three over the previous year, were divided as follows: From street boxes, eighty-four; by telephone, 150; by local calls, fifty-two. Of the fires 146 were in wooden buildings, 101 in brick or stone buildings and thirty-nine in other than buildings. Of the causes of the fires, foul chimneys lead with fifty-one, carelessness is second with thirty-seven, and flying sparks third with thirty-three. The loss for the year was \$35,090 on buildings and \$148,330.50 on contents, a total loss of 10.2 per cent. on the value of the property involved.

THE FIRE DEPARTMENT OF LOWELL, MASS., cost \$134,304.08 for 1904. The force is made up of a permanent and call force, of which the former has eighty-three and the latter ninety-three men, giving a total of 176 men in the department. The apparatus consists of the following: Six engines, eleven two-horse hose wagons, one Babcock aerial truck and three trucks of other patterns, two chemical engines, one Hale water tower, one patrol wagon and sleigh, six hose pungs, eight fuel wagons, two wagons and one sleigh for use on fire alarm, one wagon and sleigh for chief's use, one wagon for assistant chief, nineteen fire extinguishers and in reserve are three two-horse hose reels. The fire alarm system has 118 public and eight private signal boxes, 100 miles of wire and 400 cups. There are twenty telephones connected with the fire alarm system, and they are supplied by a 110-cup storage battery. The apparatus is drawn by fifty-seven horses. There were 707 fire alarms during the year, of which 217 were given from boxes, 279 were stills, 156 telephone, twenty-seven automatic and twenty-eight exposures. The number of hours actually worked were 2,116¾; the feet of hose laid, 106,950; hours of hydrants in use, 403; number of fire extinguishers used, 419; number of chemical tanks used, 135; feet of ladder raised, 7,723, and the hours worked by engines, seventy-three and one-half.

LITERATURE ON MUNICIPAL TOPICS*

Reviews of Some Important Books—What the Magazines and Reviews Have to Say about Civic Affairs—Municipal Reports Received

Books

Fire Tests with Automatic Fire Alarm Systems. An Automatic Fire Alarm System, by the Autopyrophone Company, Ltd., Copenhagen. The report of the committee. Flexible cover, 8vo., 36 pages, illustrated, price 3/6d. Published at the offices of The British Fire Prevention Committee, No. 1 Waterloo place, Pall Mall, London, England.

Report of a Fire and Water Test Made Upon Truss Metal Lath Partitions at the Fire Testing Station, Columbia University, New York City. Test, Conducted by Ira H. Woolson, E. M., Adjunct Professor of Mechanical Engineering, in co-operation with The City Building Bureau.

This report is known as Columbia Fire Station Test No. 3, Fire Test series No. 145. Paper cover, 8vo., 18 pages, illustrated, price 25 cents.

This test was made upon a plaster partition August 24th, 1904. It was made in strict accordance with the specifications of the New York City Building Bureau, and the installation of the partitions, as well as the test was at all times under the direct supervision of its Engineering Staff. The official approval of the system by the Superintendent of Buildings, Boroughs of Manhattan, Brooklyn, and the Bronx is attached as an appendix to this report.

Petroleum. By Sydney H. North. Cloth, small 12mo. 132 pages. Illustrated. Price, \$1. Published by The Walter Scott Publishing Co., Ltd., New York.

The table of contents will sufficiently indicate the object and scope of the book. The chapter titles are as follows: Chapter I, "The Origin of Petroleum"; Chapter II, "The Chief Oil Fields of the World;" Chapter III, "Geological Conditions;" Chapter IV, "The Composition of Crude Oil;" Chapter V, "Refining the Oil;" Chapter VI, "Drilling for the Oil;" Chapter VII, "Testing of Petroleum;" Chapter VIII, "Oil for Motors;" Chapter IX, "Oil for Fuel Purposes;" Chapter X, "Petroleum on the English Market;" Chapter XI, "Transport and Storage;" Chapter XII, "An Oil Property and Its Management."

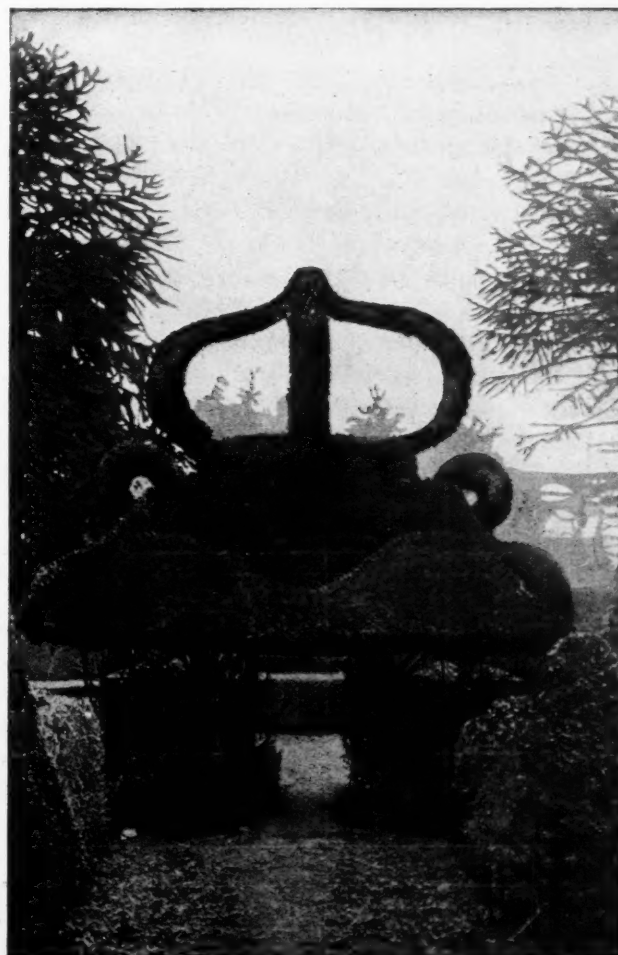
Private House Electric Lighting, a popular hand-book of modern methods in wiring and fitting as applied to private houses, including a chapter on small generating plants. By Frederick H. Taylor, Associate Member of the Institution of Electrical Engineers; also member of the Society of Arts. Board cover, 12mo, 128 pages, illustrated, price 1s., net. Published by Percival Marshall & Co., London, E. C.

"This work is not intended to be a text book for engi-

neers and others who may be seeking to aid their technical knowledge in regard to electric lighting. It was originally published as a series of articles in 'The Model Engineer and Electrician.' This matter has been thoroughly revised, and with the addition of a chapter on private generating plant, is published in this form with the hope that it may prove of service to those who, though not necessarily electrically trained, yet wish to gain an intelligent and accurate idea of good modern practice in the electric lighting of private houses." So the author expresses himself in the preface.

A Book of Topiary, by Charles H. Curtis, F. R. H. S., Asst. Editor of the "Gardener's Magazine"; previously Asst. Supt. of the Royal Horticultural Society's gardens, Chiswick, and formerly at the Royal Gardens, Kew; and W. Gibson, head gardener at Levin's Hall, Westmoreland. Cloth, 12mo, 80 pages, 36 illustrations, price \$1.00 net. Published by John Lane, London and New York.

This book contains a historical account and practical description of the Art of Topiary, or in other words the art of



AN EXAMPLE OF THE "ART OF TOPIARY"

* Any book or periodical reviewed or mentioned in THE MUNICIPAL JOURNAL, or elsewhere, will be sent to any address on receipt of price.

clipping trees, making them assume the form of animals, birds and various objects including all varieties of hedges and ornaments. The practice has been referred to as a monument of perverted taste, but it was popular for about 150 years, centuries ago.

"Topiary in history," the author confesses, "is somewhat difficult to piece together, and, so far as the writer is aware, no attempt has hitherto been made to place such history before the gardening public. It is, therefore, modestly suggested that this work is somewhat unique among books dealing with horticultural subjects, and it is hoped it may be found to deserve a position in every garden library."

The author does not expect nor even hope to revive the old practice, but rather to provide an hour's reading upon an interesting branch of horticulture.

A Treatise on Concrete, Plain and Reinforced Materials of Construction and Design of Concrete and Reinforced Concrete, with chapters by R. Feret, William B. Fuller and Spencer B. Newberry, by Frederick W. Taylor, M. E., and Sanford E. Thompson, S. B., Assoc. M. Am. Soc. C. E. First edition, First thousand. Cloth, 8vo., 585 pages, 176 figures, price, \$5.00. Published by John Wiley & Sons, New York.

According to the authors, the book is primarily prepared for practical engineers and contractors as well as for a text and reference book on concrete for engineering students. To avoid personal inaccuracies each chapter has been submitted for criticism to at least one and in some cases to three or four specialists in the particular line treated. The authors have exercised unusual care in referring by name to all authorities quoted, giving the names of books or periodicals from which quotations are made so that each subject may be investigated further. Mr. Spencer B. Newberry, an international authority on the subject treated, has written Chapter VI., on "The Chemistry of Hydraulic Cement." He discusses this complex subject in such a clear and practical manner that it will be interesting not only to the scientist but also to the general user, and to the cement manufacturer. Mr. Newberry has also criticised Chapter V.

The subject of proportioning concrete has been treated by Mr. William B. Fuller, the concrete expert, and his practical use of mechanical analysis is fully discussed. Mr. Fuller has examined and criticised all the chapters on practical construction.

The Cement-Workers' Hand-Book, covering more than fifty most important subjects on cement and its uses in construction. Compiled to meet the requirements of the common workman. By W. H. Baker. Cloth, 12mo, 86 pages, price, 50 cents. Published by W. H. Baker, Wadsworth, O.

The object of this book is tersely stated in the preface by the author: "We aim to make this little book so simple, so clear, and fundamental, that the farmer and others not familiar with cement may do much of their own work, confident of success, while the more difficult work in this line must of necessity go to the regular cement worker, or mason."

Articles in American Periodicals

Heating and Ventilation—VIII., (illustrated), by Charles L. Hubbard. *The American Architect*, June 17, New York.

Mechanical Filter at Bingham, N. Y. (illustrated), by George C. Whipple, Assoc. M. Am. Soc. C. E. *The Engineering Record*, June 17, New York.

What a City Might Be (illustrated), by M. G. Gunniff; *What the Public Schools Achieve* (illustrated), by Charles C. Johnson; *Libraries for Everybody*, by Herbert Putnam; *Modern Comforts in Village Life*, E. N. Vollandigham, and *A Model City School*, by Dorothy Canfield, appear, among others, in the *World's Work*, July, New York.

Heating and Ventilation—IX., (illustrated), by Charles L. Hubbard. *The American Architect*, June 24, New York.

Sewage Purification Plant at Charlotte, N. C. (illustrated), by Cecil C. E. Beddoes, Consulting Engineer. *The Engineering Record*, June 24, New York.

Elevated Construction in Paris and Berlin (illustrated), by John P. Fox. *Street Railway Journal*, June 24, New York.

Municipal Ownership and Graft, by Francis W. Parker, member of the Illinois Senate. *The World To-Day*, July, Chicago.

How British Cities Manage Public Utilities, by Frederick Upham Adams. *The State*, July 8, Providence, R. I.

Suitable Cars for City and Suburban Service (illustrated), by T. W. Wilson, *Street Railway Journal*, July 8, New York.

Progress of Standardization of Water Analysis in the United States; Impact Tests of Asphalt Paving Mixtures (with tables), a paper read before the American Society for Testing Materials by Clifford Richardson and C. N. Forrest. *The Engineering Record*, July 8, New York.

Heating and Ventilation—X., (illustrated), by Charles L. Hubbard; *Bibliography of School-House Sanitation*, a list of books compiled by Mr. William Paul Gerhard, Consulting Engineer. *The American Architect*, July 8, New York.

Reinforced Concrete, by Walter Loring Webb; *The Bacteriological Treatment of Sewage*, by F. Herbert Snow. *Proceedings of The Engineers' Club of Philadelphia*, July, 1122 Girard street, Philadelphia.

Articles in Foreign Periodicals

Municipal Works of the City of Gloucester (illustrated), by R. Read, Assoc. M. Ins. C. E., city surveyor of the city of Gloucester, Eng. *The Surveyor and Municipal and County Engineer*, June 9, London, Eng. Price, 3 pence.

Water Supply Works at Sidney (illustrated); *Hydraulic Compressed Air Plant* (illustrated); *Sengbach Reservoir at Solingen, Prussia* (illustrated); *Water*, June 15, London, Eng. Price, 6 pence.

Gloucester Electricity Works (illustrated), by Walter J. Bache, M. I. E. E., borough electrical engineer. *The Surveyor and Municipal and County Engineer*, June 16, London, Eng. Price, 3 pence.

Municipal Savings Banks, by Mr. F. J. Beckett, A. C. A., city accountant, Chester, Eng., a paper read before the twentieth annual general meeting of the Municipal Treasurers and Accounts (incorporated), held at Portsmouth,

Eng.; *Libraries for Children*, by Mr. L. Stanley Jast, chief librarian of Croydon, Eng., a report presented jointly to the Education and Libraries Committee of Croydon, *The Municipal Journal*, June 23, London, Eng. Price 2 pence.

A Sewerage System for Rural Homes, Schools and Factories (illustrated), by M. J. Quinn, Provincial Mechanical Superintendent, Ontario Provincial Board of Trade, *The Sanitary Record*, June 29, London, Eng. Price, 3 pence.

Sanitary Economics; London Power Menace, The Municipal Journal, June 30, London, Eng. Price, 2 pence.

"*The Heating of Buildings and on Dust Deposition*," by Prof. W. F. Barrett, J. P., F. R. S., M. I. E. E., etc. *The Public Health Engineer*, July 1, London, Eng. Price, 6 pence.

Administration by Municipal Engineers (illustrated), by Ernest J. Elford, M. Inst. M. E. *The Surveyor and Municipal and County Engineer*, June 30, London, Eng. Price, 3 pence.

Public Documents Received

ANNUAL report of the chief engineer of the fire department of Portland, Me., for 1904. M. N. Eldridge, chief.

Thirty-eighth annual report of the commissioners of the water-works of Erie, Pa., 1904. Clark Olds, president.

Annual report of the auditor of Fall River, Mass., for 1904. Henry W. Clarke, auditor.

Annual report of Bessemer, Ala., for 1904. Thomas H. Huey, mayor.

Transactions of the Association of Civil Engineers of Cornell University, Vol. XIII., 1904-5. W. H. Gerwig, president.

Papers, transactions for 1905 and proceedings of the twenty-first annual meeting of the Connecticut Society of Civil Engineers. Albert B. Hill, president, New Haven, Conn.

Bulletin of the Department of Labor. No. 57—March, 1905.

Report of the Commissioners of Lincoln Park, Chicago, Ill., for 1904.

Nineteenth annual report of the bureau of water of Schenectady, N. Y., for 1904. George T. Ingersoll, superintendent water-works.

Thirty-second annual report of the water board of Lowell, Mass., 1904. Robert J. Crowley, president.

Annual reports of Rockford, Ill., for 1904. Charles E. Jackson, mayor.

Tenth semi-annual report of the sewerage and water board of New Orleans, La., December 31, 1904. Martin Behrman, president.

Proceedings of the tenth annual convention of the National Association of Manufacturers, 1905. Marshall Cushing, secretary, 170 Broadway, New York.

MACADAM STREETS OF ROCKFORD.—The City of Rockford, Ill., macadamized 385 miles of streets in 1904 at an average cost of 36.7 cents per square yard, including grading, curbing and macadamizing. The average cost of macadamizing was 28.6 cents per square yard; grading, 4 cents per square yard. Plank curbing costs about 10 cents per

lineal foot. Only \$15,000 was expended on macadam streets last year, whereas in former years \$25,000 was expended. The reduction in the appropriation was due to the large amount of other public improvements made during the year. The city runs its own stone quarry and stone crusher. Work was commenced at the quarry April 18th and closed November 5th, during which time 12,821 cubic yards of stone were crushed, at an average cost of 44.6 cents per cubic yard. In addition, 7,590 cubic yards of shovel rubble was taken from the quarry, making a total of 20,411 cubic yards of stone.

CITY CANNOT DEMAND FREE TELEPHONES.—The Supreme Court of the State of Ohio recently handed down a decision in the case of Farmer and Geitz against the Columbia County Telephone Company, which declares that municipalities cannot require from a telephone company free telephones as a consideration for the granting of a franchise, and that all such requirements are invalid. The Court said that the right to enter upon the streets of a municipality by a telephone company is derived from the state, and that the municipality can only say in what manner the street will be used, and that it can exact no more compensation from the company than that required to replace the streets to their original condition.

Wages of Municipal Employees in Frankfort*

THE schedule of wages of city employees, which first went into effect in 1897 and was last revised in 1900, has again been revised by the common council of the city of Frankfort, the changes to go into effect April 1, 1905. They are chiefly intended to assist workmen with large families by giving them extra allowances for rent. In all classes and grades on the wage schedule the permanent workman will receive additional pay (\$1.20) for rent per month, provided he has three or four children; and if he has more than four children he will receive \$2.40 per month. Wages of all grades are bettered, inasmuch as the former lowest grade of one year's duration is dispensed with, so that the increase now begins with those formerly of the second grade. Workmen of all grades enter upon a higher grade one year earlier than under the former schedule. The highest wages, those of the fifth grade, can be reached in thirteen years. In the lowest grade the wages commence with 81 cents per day and increase to 90 cents. Laborers who have to perform specially hard work will receive additional pay amounting to from 4.8 cents to 9.6 cents per day.

It has been agreed to allow permanent laborers who have been steadily employed for more than three years vacations not to exceed four days a year with continued pay; if employed more than six years, vacations are not to exceed six days. These provisions will also apply to the personnel of the electric works and the street car lines, with the exception of conductors and drivers, for whom two special schedules are fixed. In the future a street car conductor will receive for the first year 83 cents per day, increasing through nine grades from \$22.62 to \$32.14 per month. The provisions for additional pay for rent apply also to the employees of the street car lines.

* From United States Consul-General Guenther, Frankfort, Germany.

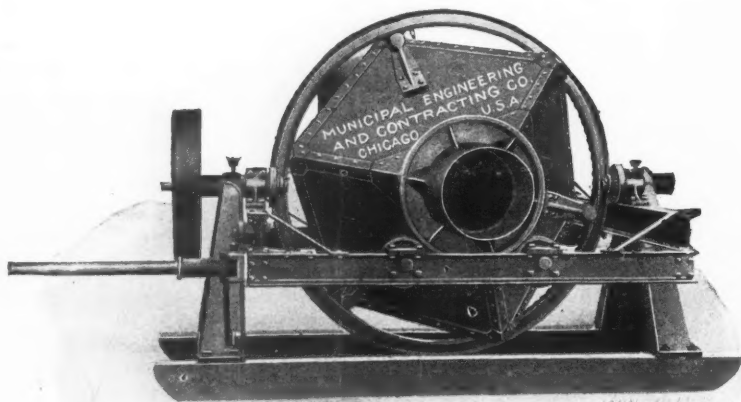
Improved Concrete Mixer

It is said that some contractors have discarded continuous mixers to purchase the Chicago improved cube concrete mixer, as it is said to turn out a superior quality of concrete in the same time. This machine is charged and discharged while revolving, without any lessening of speed. The makers have records of the work of one of their small machines, which show nine batches in ten minutes. Many contractors who have used this mixer say that their regular time is one and one-quarter minutes for each batch. In a recent annual report of the chief engineers of the United States Army will be found the following mention of this mixer, of one yard capacity, used in the construction of the concrete pier at Duluth, Minn.: "From an extended average of results this mixer has demonstrated its ability to turn out a batch of very perfectly mixed concrete in every one minute and twenty seconds."

It is claimed by the makers that the Chicago improved cube concrete mixer is absolutely the best mixer on the market, for the following reasons:

"1st. The revolving cube is scientific and the only rational form of mixer.

"2nd. The method of dumping the Chicago improved cube con-



CHICAGO IMPROVED CUBE CONCRETE MIXER ON SKIDS, WITH SWINGING HAND DUMP. LARGE SIZES HAVE AUTOMATIC POWER DUMP.

crete mixer calls for less expenditure of effort than devices used on mixers of other makes.

"3rd. Our methods of loading, revolving and discharging the cube are the acme of simplicity. No complicated machinery to get out of order.

"4th. Skilful designing is supplemented by the best of workmanship, combined with the use of only the best material.

"5th. The Chicago improved cube concrete mixer in first cost is no higher than any mixer of hitherto approved form.

"6th. It is run at less expense than any other mixer.

"7th. It turns out the most concrete in the least time at the lowest cost."

Those interested who desire fuller particulars concerning this remarkable machine can have the same by asking for circular No. 37. Address Municipal Engineering & Contracting Co., Railway Exchange, Chicago, Ill.

North-Western Line Chicago Terminals

A DESCRIPTIVE pamphlet with large scale map of its extensive and complete terminal facilities at Chicago has been prepared by the Chicago & North-Western Railway. This will be of interest to industrial concerns located on these terminal lines, and more especially to those seeking new sites with adequate railway conveniences. Send for free copy to Industrial Department, C. & N. Railway, Chicago, Ill.

Practical Experience Stands for Quality

WHEN anything good is placed on the market it is sure to be imitated, and something "just as good" will be hawked about and, if possible, substituted for the real thing. That "bargain counter hunters" are thus imposed upon is not at all strange, but it is more than singular why a municipality should assume the tactics of the bargain hunter in purchasing anything for its own use. Ninety-nine times out of a hundred the bargain hunter gets the little end of the bargain in the dry goods store, and the municipality which seeks to find a bargain in some particular line of apparatus or equipment or construction, will just as surely get the poor end of the bargain. This is particularly true in the matter of paving construction.

The experience of Paris, Ky., is apropos as an illustration of this point. A detailed description of this incident has been given in previous issues of THE MUNICIPAL JOURNAL, so that the story need not be repeated. It is sufficient to refer to a continuation of that city's troubles because it sought to get a bargain by purchasing something "as good as" and rejecting "the real thing" because it was a little higher in price.

Ever since the season opened the city has been urging the contractor who laid the "as good as bitulithic" pavement in its streets to come and repair it as it was in wretched condition. In response to repeated requests for the contractor to make good and as many replies in the affirmative, on June 3d, the contractor wrote to Mr. James O'Brien, chairman of the street committee of Paris, as follows:

"I have been busy at work since my return from Paris. It was no easy task to get an agreement to have a plant in Paris in thirty days' time, and up until this morning the very best offer I had was seventy-five days. I am happy to advise, however, that I have succeeded in arranging to ship a new and most modern plant to Paris which we expect to have there within fifteen days. We shall positively be at work in not to exceed thirty days. We expect to be at work in less time."

The sequel, which is given in the following excerpt from the *Bourbon News*, of Paris, Ky., shows that the city will have to wait a still longer period. Under date of July 7th, the *News* says:

"The machinery that was to have arrived here Monday, to rebuild Main street, must have been side-tracked at some remote station. On Tuesday, Officer Ben Bishop said it would be here Thursday, sure, but forgot to state what Thursday. He must have meant the first Thursday in October, just when our merchants are having their busiest season. That will be a most excellent time to tear up the street again."

Correct Information About Concrete

UNDER the title of "Instruction to Agents" The Municipal Engineering & Contracting Co., Railway Exchange, Chicago, Ill., has published a 32-page pamphlet on the subject of cement and concrete. Without doubt it is correctly assumed that a great many articles treating this subject are gotten up on the scissors and paste pot plan. This is due in all probability to the newness of the industry, for the same complaint has been made of every other industry that has grown to large proportions. This company, in order to protect its own interests, has found it necessary, owing to the conditions referred to, to instruct its agents and give them a proper course of training about the subject of cement and concrete in order that they may talk intelligently of the Chicago improved cube concrete mixer. This book of instructions to agents gives them reliable information prepared by an experienced engineer, besides including all necessary information about the machine the agents are to sell. This booklet contains information that will doubtless be of interest to all city engineers, contractors and others who make use of cement and concrete in any form. The company has a limited number of copies which will be sent to inquirers who are interested.

American Fire-Proof Construction Wins in London

AMERICANS are sharing in the London building boom. No less than four large hotels are under construction and contemplated, in addition to a great number of office and warehouse buildings. In connection with this boom, British architects and builders are adopting to a considerable extent American methods of steel frame and fire-proof construction.

The National Fire-proofing Company has been successful in securing a number of contracts for fire-proof work in these new buildings, and has recently made a test in London of its patented reinforced terra cotta floor arch construction. This test was made under the direction of the British Fire Prevention Committee.

The fire-resisting floor-arch construction which was tested consisted of hollow tiles of burned clay material, with a metal reinforcement in the form of a wire truss. This arch was supported by steel I beams, spaced at proper distances to safely sustain the superimposed load to be carried.

The requirements of the British Fire Prevention Committee are very rigid, consisting of a fire test of four hours at a temperature of 1,700 degrees, after which water is applied to the under side of the arch.

Such a test of the construction described was made on June 28th, and was entirely successful. The result of the test was satisfactory to the authorities, and assures a large amount of fire-proof floor construction in London by this method.

The hollow-tile, reinforced floors are absolutely fire-proof, and at the same time are much lighter and stronger than other systems heretofore used in London.

What an Editor Thinks of "As Good As Bitulithic"

THE editor of the "Bourbon News," Paris, Ky., has the following comments to make on the paving situation in his town, in the issue of July 11th:

"We are in receipt of a pamphlet from Warren Brothers Company, the well-known Boston firm that put down the best of streets, which is devoted to criticisms on streets in different parts of the country like Main street in Paris. They show by experts that they have been a failure. The pamphlet gives considerable space to the Paris street, and claims that it has turned out just as this firm predicted it would when the Indianapolis Company received the contract over them.

"The condition of Main street at this time is something awful. The filth and mud on top of the mushy tar makes it difficult to be crossed by ladies at all without ruining their skirts and pretty shoes. The time for the Indianapolis people to arrive has gone by, and it is believed by many that they never expect to make good. Why wait on them any longer? File suit against their bondsmen and get some company to repair the street, or let the city hands do it. Why wait again until the busy season with our merchants to tear the street up? Councilman O'Brien with his force of street hands has demonstrated that they can put down as good a street as is needed, and if you are not going to give us something out of the ordinary for Main street give us the plain macadam."

Los Angeles Buys "Metropolitan" Engines

LAST January the city of Los Angeles, Cal., had a competitive test between the Metropolitan and the Nott engines, in which the "Metropolitan," as the official records show, won in points and superiority. Committees from most all California cities witnessed this test, and it is significant to note that Long Beach (near Los Angeles), San Francisco, and Santa Rosa, Cal., all bought "Metropolitan" engines after this test. Nott engines, however, were bought by Los Angeles in spite of the test.

It is significant to note, however, that on Monday, July 3, Los Angeles placed an order with the American-La France Fire Engine Company for three third size "Metropolitan" steam fire engines; this is a result of having given other engines a trial and should satisfy the makers of the "Metropolitan" engines that that engine is by far superior to any other on the market.

Industrial Development

AN Industrial Bureau has been established by the Chicago & Northwestern Railway, the purpose of which shall be to furnish reliable information regarding the many desirable locations along The North-Western Line for new manufacturing enterprises.

The rapidly growing cities and the splendid resources of the territory reached by The North-Western Line combine many of the essentials to industrial success. Fine water power locations that may be supplemented by electrical energy developed therefrom, vast forests of hard and soft timber for all kinds of woodworking concerns, mineral wealth that provides the material for foundry and machine work, coal fields close at hand, and an excellent supply of a good class of labor are all found here.

This feature should prove of much benefit not only to the railway company, but also to the communities along the line, and such of them as have commercial organizations will find ready co-operation by this department.

It will also prove a time-saving convenience to manufacturers seeking new locations or desiring to establish branch establishments, to whom information will be promptly furnished upon application.

Items of Interest About the Trade

—The Minneapolis Water-Works has awarded a contract for 5,000 Keystone meters $\frac{5}{8}$ " size, to The Keystone Meter Company, East Pittsburg, Pa.

—The city of Pittsburg has awarded the contract for furnishing the asphalt paving plant for which bids were recently asked, to The Kelly-Springfield Road Roller Company, of Springfield, O.

—Bulletin No. 10, of the De Laval Steam Turbine Co., Trenton, N. J., gives a fine sketch of the inventor, Dr. De Laval, and a full description of the works and product of the De Laval Steam Turbine Company. It is a number of the De Laval Bulletin in which all city engineers and water-works people will be interested in.

—The city of Los Angeles, Cal., has awarded the contract for the purchase of three "Metropolitan" fire engines from the American La France Fire Engine Company, of Elmira, N. Y. At the same time the city purchased six combination chemical engine and hose wagons, and 20,000 feet of fire hose. This is said to be the largest order for fire equipment ever given by any city at one time.

—The Diggs automatic extinguisher and the Diggs upright extinguisher, manufactured by the Diggs Fire Extinguisher Company, of New York, have been approved by the U. S. Steamboat Supervising Inspectors. The fire extinguishers made by the Diggs Company have gained an enviable reputation throughout the United States, resulting in a constantly increasing demand. The company has just filled a large order for the Panama Canal Commission and has in hand some good-sized orders for England and South Africa.

—The excellent service rendered by Firestone rubber tires on the apparatus of the Syracuse (N. Y.) Fire Department has resulted in the equipment of practically all the Syracuse apparatus with the Firestone side-wire tire. The special adaptability of the Firestone tire for fire department service is shown by the statement of the company that about 95 per cent. of the rubber tires used in American fire departments are of the Firestone side-wire variety.

—The Fulton & Walker Co., 20th and Filbert streets, Philadelphia, have issued a circular regarding the various styles of ambulances which they manufacture. The manufacture of ambulances has been a specialty with this company for many years, and their vehicles are now in use by municipal and private hospitals in every State in the country. They also make a high grade line of police patrol wagons.

—Catalogue "H" of the Marinette Gas Engine Co. illustrates and describes their gas and gasoline engines for municipal lighting and pumping plants.

—The Fabric Fire Hose Co., formerly at 68 Murray street, New York, has removed to the corner of Duane and Church streets. This company is the originator, patentee and sole manufacturer of the celebrated wax and Para gum treated rubber lined cotton fire

hose. There is nothing more essential to a well-equipped fire department than a thoroughly reliable hose. The hose made by this company is not only light, pliable, compact, free from inside friction, kinking or twisting, but is strong and absolutely waterproof. Their book on the subject of fire hose will interest you. It also contains a very complete list of fire department supplies, etc., and may be had for the asking.

—"Interurban Railway Construction" is the title of an artistic bulletin just issued by J. G. White & Co., Inc. The bulletin is illustrated with several interesting half-tone reproductions of various phases of Interurban Railway work, as executed by the White Company. The reading matter in this bulletin describes the organization and scope of the J. G. White Company and the three associated White companies—J. G. White & Co., Ltd., London, England; Waring-White Company, Ltd., London, and the Canadian White Company, Ltd., Montreal. A copy will be sent to anyone writing for same to the home office, J. G. White & Co., 43 Exchange Place, New York.

THE CINCINNATI, O., FIRE DEPARTMENT has twenty-nine steam fire engines in active service and four in reserve; thirty-nine hose wagons in active service and one in reserve; twelve ladder trucks, one service truck, three eighty-five foot turn-table extension ladder trucks, one seventy-five foot turn-table extension ladder truck, and one three-horse Hale water tower, all in active service; also, one hose reel, two fuel wagons, two supply wagons and two other wagons. In reserve are ten hose reels, one chemical engine and three ladder wagons. The expenditure of the department for 1904 was \$502,762.99. There is on hand 70,500 feet of two and one-half inch cotton hose; 6,325 feet of one-inch rubber hose; 2,000 feet of two and one-half inch rubber hose, and 545 feet of three and one-half inch cotton hose, besides the hose that is in the repair shop. The fire alarm system has 556 fire alarm boxes, 2,795 feet of aerial and 48,461 feet of underground cable, and about 701 miles of aerial wire. There are fifty-four sets of portable telephones carried on the apparatus. There were 1,406 fire alarms in 1904, of which 1,015 were still and 391 were bell alarms. The insurance on the buildings was \$2,064,400.36; insurance on contents, \$2,854,408.51; value of the buildings, \$2,881,616; value of contents, \$3,027,866.21; the loss on buildings was \$337,072.07; loss, contents, \$1,207,251.55. The insurance recovered on the buildings was \$252,707.80, and on the contents, \$979,608.44. The total area of the city is forty-two and one-half square miles.

THE REPORT OF THE FIRE DEPARTMENT OF DAVENPORT, IA., FOR 1904.—The annual force of Davenport comprises thirty-six officers and men. The apparatus is drawn by nineteen horses. There is on hand 6,150 feet of "good," 2,930 feet of "fair" and 1,450 feet of "poor" hose, a total of 10,530 feet. The department responded to 164 alarms, of which nineteen were false. There were 112 telephone, thirty-four box and eighteen still alarms. There were 145 fires, with a total loss for the year, excepting the adjusted loss, of \$31,060.45, on which there was an insurance of \$151,000. Several fires were outside the city, leaving a loss of only \$20,060 for the protected part of the city. The expenses of the department for 1904 were \$38,557.12, and the valuation of its property is \$81,900.

THE FIRE DEPARTMENT OF PORTLAND, ME., responded to 340 alarms last year, an increase of forty-one over the preceding year. Of these 114 were bell and 226 still or telephone alarms. Chief Melville N. Eldridge says: "Of the number of fires the past year, 169 originated in wooden buildings, eighty-nine in brick or stone buildings, fifty-eight in grass or rubbish, five in freight cars, one in locomotive cab, one in switch box, one in steamship, one in street, one in fence, one in wood pile, two on wharf, one on awning, one in junk wagon, two in naphtha launch, two in trees, one on power pole, one in ash barrel, one in coal hoister, and two were false." The value of the buildings was \$1,033,832.53, and the loss \$96,125.02; the insurance was \$473,080.40, and the amount paid \$95,939.72; the value of the contents was \$623,929.12; the loss, \$126,444.80; the insurance, \$348,650, of which \$121,873.05 was paid. The total insurance was \$821,730.40, the total loss \$222,569.82, making a net loss of \$4,757.05.

PAWTUCKET, R. I., SPENT \$45,803.04 ON ITS FIRE DEPARTMENT LAST YEAR.—There is 17,250 feet of fire hose on hand, of which 9,950 feet is in first-class condition, 6,550 feet in good condition, and 1,150 feet in poor condition. There are seven combination hose and chemical wagons, six of which are in service and the remaining one held in reserve; one Seagrave trussed truck, one Gleason and Bailey seventy-foot aerial truck and two city trucks, one of which is in reserve; two steamers, in reserve; six exercising wagons, one chief's buggy, supply wagon and one other wagon. There are twenty-two horses. The roll of the department contains one chief, engineer, two assistant engineers, forty-five permanent and nine call men, making a total of fifty-seven men. The total number of hydrants is 605. The loss and insurance figures are as follows: total loss, buildings and contents, \$48,182.98; loss on buildings, \$19,201.61; insurance paid on buildings, \$14,873.04; loss over insurance, \$4,327.67; loss on contents, \$28,981.37; insurance paid on contents, \$25,466.37; loss over insurance, \$3,515.00; total insurance paid, \$40,340.31.

CHEMICAL AUTOMOBILE FIRE ENGINE.—According to German papers, Leicester, England, claims to be the first city in the world to have a chemical automobile fire engine. An automobile, capable of traveling over 30 miles an hour, carries the apparatus, which consists of a large cylinder, partly filled with water in which carbonate of soda is dissolved. A bottle filled with sulphuric acid is at the top of the cylinder, and when a stream of water for extinguishing a fire is needed the bottle is turned upside down, whereby the acid flows into the solution of soda, and carbonic-acid gas is developed. The mixture is kept stirred up by means of rotating blades. Carbonic-acid gas is so quickly formed that the pressure in the cylinder soon amounts to 150 pounds. This is sufficient to throw 40 feet high a stream four-fifths of an inch in diameter. When this water reaches the fire, the carbonic-acid gas escapes in large quantities, crowds out the air, and prevents combustion. The cylinder is pumped out in four minutes. The city authorities will probably soon make a report as to the efficiency of the engine.